February 4, 1946

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

NOLOGY DEPT.

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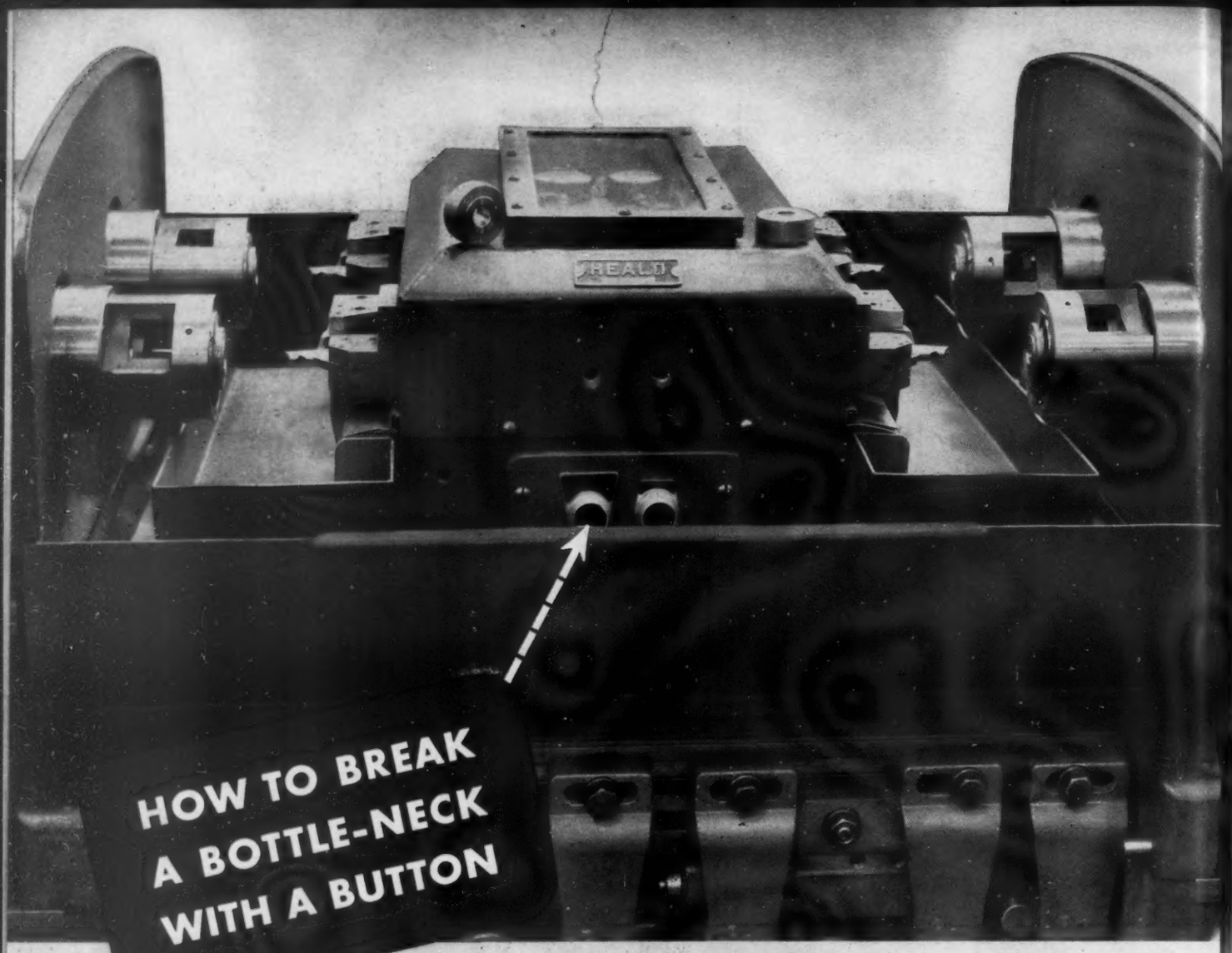


HOW TO BREAK A BOTTLE-NECK WITH A BUTTON

You can't always control production slow-downs—but anytime you can eliminate six or seven manual operations, and replace them all with a single push-button control, your production line is going to move faster, your costs are coming down. And that's precisely what the Heald Bore-Matic is engineered to do.

In turning out work requiring the most complex multiple operations, control of the Heald Bore-Matic is simplicity itself. For here, at the mere push of a button or the turn of a lever, the operator starts a cycle that can be *completely automatic* from initial cut to final size. What this offers you in faster production, reduced operator fatigue, less scrap and more over-all efficiency can well mean the difference between profit and loss in these days when production costs must be shaved at every turn.

In the illustration above, we have shown the Heald No. 49 Bore-Matic as used on a transmission pinion gear which is bored, faced and chamfered in one automatic cycle—two pinions being finished in one end of the machine and two others at the opposite end.

Bore-Matic cycles can be engineered to meet your own particular requirements for either simple or complex operations, in any combination including boring, turning, facing, grooving, milling, chamfering. Automatic functions (except for loading) may include rapid in-traverse, feeds, speeds, back boring, tool retraction, runout and control table operation as well as cross slides, cross-feed units, auxiliary slides, spherical attachments. Cycles are usually interlocked and hence foolproof.

Heald Bore-Matics are also available with manual control, but it's the push-button cycle that pays off in top production at minimum cost. Our engineers will gladly submit suggestions on how your production can be improved with the Heald Bore-Matic. Write today for further details.

THE HEALD MACHINE COMPANY
WORCESTER 6, MASS.

HEALD

means finer precision
. . . lower costs

INTERNAL AND SURFACE GRINDING MACHINES · BORE-MATIC PRECISION FINISHING MACHINES

BETHLEHEM
STEEL

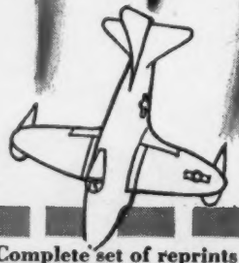
JET PROPULSION TURBINES *by* BROACHING . . .

Step 3

AMERICA'S record-breaking output of munitions during the war proved that broaching by *American* was capable of performing accurate metal finishing operations at a faster rate than was possible by any other method. These advantages are even more important in today's highly competitive economy.

American engineers will be glad to show you how broaching will work for you in your plant. There is no obligation. Write today for details on *American's* complete broaching service—machines, tools, and engineering.

Finishing slots in jet propulsion turbines was a typical wartime problem solved by broaching, the *American* way. An *American* SB-66-15 Vertical Surface Broaching Machine, equipped with a single broach, was used to cut the finished form in the sides of the previously semi-finished grooves. By broaching, the entire form was held within tenths of thousandths at an extremely high rate of production.



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BROACH AND MACHINE CO.

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DIVISION OF

FREE! Complete set of reprints on jet propulsion operation. The three *American* advertisements describing the broaching of jet propulsion turbines will be sent to you without obligation. Just attach this convenient coupon to your letterhead!

S

NAME_____

TITLE_____

Milling Cutters
General recommendations can be given for Macklin specifications of wheels used to sharpen Milling cutter. There are, however, many kinds of milling cutters and many variants to be considered such as style of machine, condition of machine, type of material, area of contact, etc.
Courtesy of Ingersoll Milling Machine Co.
Grinding face milling cutter with straight wheel.
Most milling cutters are ground on universal tool and cutter grinders. Many attachments are available for these machines so that they can be used for different types of jobs. In some cases one general purpose wheel may suit the needs but a specific Macklin wheel is available for any particular job.
Straight wheel grinding radius end mill.
Two general methods are used in grinding the clearance of milling cutters. Spiral, straight and side milling cutters, face mills, side milling cutters and end mills are sharpened by grinding the clearance — on the periphery at an angle behind the cutting edge. Formed or relieved cutters are sharpened by grinding the front faces of their teeth so that the right shape and profile are retained.
Cup wheel sharpening end mill.
21
Milling cutters should be kept in good sharpened condition to give maximum efficiency. If allowed to become dull they will produce ragged and unsatisfactory finish. If resharpened often it is only necessary to grind small amounts from cutter to maintain sharp teeth. In the long run it is less costly and more efficient.
Courtesy of Brown & Sharpe Mfg. Co.
Cup wheel grinding periphery of teeth of large face milling cutter.
RECOMMENDATIONS
Sharpening (Straight wheel) ..... 48 A 46 K 5 V 6 Alum. Vit.
Ingersoll (Type 4) ..... 48 A 46 J 5 V 6 Alum. Vit.
29 A 36 N 7 B 4 Alum. Res.
Cups & Dish ..... 48 A 46 J 5 V 6 Alum. Vit.
48 A 60 J 5 V 6 Alum. Vit.
It is a good idea to ask the advice of an experienced grinding wheel man to assure the selection of the correct wheel for any sharpening job. Maximum efficiency will then be obtained and tools will last longer.
Grinding inserted tooth milling cutter with cup wheel.
22
FOR TOOL ROOM SURFACE JOBS
A NEW BOND for better results
MACKLIN
TOOL ROOM WHEELS

Write for this T-45 Booklet giving complete information on how to use the new V5 and V6 bonds for tool room grinding. Included in the booklet are wheel recommendations for all types of tool room grinding. Ask for sufficient copies to serve your organization.

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices: — Chicago · New York · Detroit · Pittsburgh · Cleveland · Cincinnati · Milwaukee · Philadelphia

BEHIND THE SCENES

with Shrdlu

Debuggers Wanted

Having a reputation for omniscience has its little penalties. Not that we have ever claimed to be running competition to the Delphian oracle, or anything like that, but we have supplied answers to a lot of questions which bothered people. We reached a new peak (or valley) the other day when a representative of the YWCA called up and, premising her remarks with the statement, "You know everything about surplus property disposal" wanted to know how her girls could get some portable water purifiers like the army used. Turns out what she wanted were some of the pills the boys dropped into questionable drinking water to kill the bugs. On that one we had to strike out. Anybody know where they can be had?

The Pikkellikker Is All

One of the most tongue-tickling subjects we've published in recent years has to do with spent pickle liquor, pronounced pikkelikker. For those of you who may not be initiated, it doesn't have anything to do with what's left in the barrel after all the kosher dills have been removed. Instead, it's a weighty problem in the metalworking industry where pickling processes are used to clean metals. The used-up solution has to be dumped somewhere, and it's bad stuff to have around. In a couple of weeks the editors will have ready a story of how one steel company has successfully solved the problem.

Too Much More Than Enough

Some kind friend recently sent in this story from A. O. Smith Corp., Milwaukee, via the *Milwaukee Sentinel*. Seems that expeditors at that outfit get paid hourly rates, including travel time when on the road. This means that on most days while travelling the boys can claim 24 hours work. This seems to us to be a most fair and generous arrangement, and apparently the company thinks so, too. In fact, the vice president in charge of expenses was somewhat surprised when one of the recipients of this policy turned in a statement for 25 hours in one day. Calling the culprit on the carpet, the v.p.i.c.o.e. said, "Look, chum, we don't want to seem unduly strict around here, but we thought we were doing a pretty good thing for you in giving you 24 hours pay. What's the idea of putting in a 25-hour report?"

"Well", was the nonchalant answer, "on that day I went from one time zone to another!"

Notes on a New Mill

Speaking of the A. O. Smith Co., whose men work 25 hours a day, we note that in this issue is a description of their new high-powered electric buttweld tube mill, which should be interesting reading for people interested in tubular products. Electrically welded tubular goods are no innovation, but this particular unit operates at a power of 1,000,000 amperes, more than any previous unit.

Hang It There, There and There

A skyhook is the universal imaginary gadget which engineers use to suspend things & stuff from when ordinary means of supports and fasteners don't seem to fill the bill. Because of the humorous appeal of the name, somebody is always trying to apply it to an existing product. One of the most recent of these concrete examples of an abstract term is a thing which looks like a pair of double-ended ice tongs without handles. This Sky Hook, with capital letters, is a product of Templeton, Kenly & Co., Chicago, and is used to fasten chains together, to make temporary repairs to conveyor chain, or to suspend stuff from beams or pipes. Now, when you send a boy for a sky hook and a left-handed monkey wrench to tighten it with, watch out. He may return with one of these gadgets, and then you'll have to find some way to use it.

Metals Gild the Plastic Lily

Plastics, we read, are going to supplant metals in a lot of applications. Apparently some manufacturers feel that although they can successfully substitute plastics for metals, there are some things which the public expects to be made out of metal and therefore will offer sales resistance to the same items made from plastics. Also, there are a lot of gadgets which could be made at a lower cost by making them out of plastics and coating the plastic with metal. At any rate, the subject of coating plastics with metals is a hot one at the moment, and we've just learned that an article on this particular form of lily-gilding will be forthcoming in STEEL very shortly. It's a how-to-do-it type of thing, which will give you all the dope in two delicious installments.

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(Editorial Contents—Page 83)

SHARONSTEEL

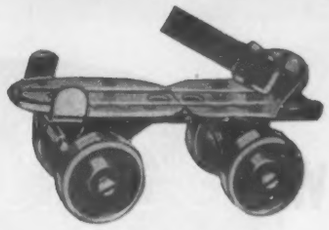
PROGRESS

FOR FORTY-FIVE years Sharon Steel Corporation has specialized in the production of high grade steels—always alert to improvement in its equipment and the quality of its products.

The recent purchase of the Farrell Works of Carnegie-Illinois Steel Corporation is another important step in the history of this progressive company. This new acquisition provides to Sharon Steel an ample supply of basic raw materials and makes available facilities which should place the company in a much stronger position from a competitive standpoint.

The Farrell Works, with its two 800-ton blast furnaces and fifteen open hearth furnaces, provides an annual capacity of 500,000 gross tons of basic pig iron and upwards of 750,000 gross tons of open hearth ingots —and the installation of two new electric furnaces will provide capacity to produce annually 100,000 tons of stainless, alloy and other electric furnace steels.

The steady growth of this company over a period of nearly half a century has been founded on the principle of endeavoring always to meet the most exacting requirements of its customers, to protect the investment of its shareholders and to maintain a friendly relationship with all of its employees.



SPECIALIZING IN

Stainless Steels
Alloy Steels
High Carbon Steels
Galvanite and Special Coated Products
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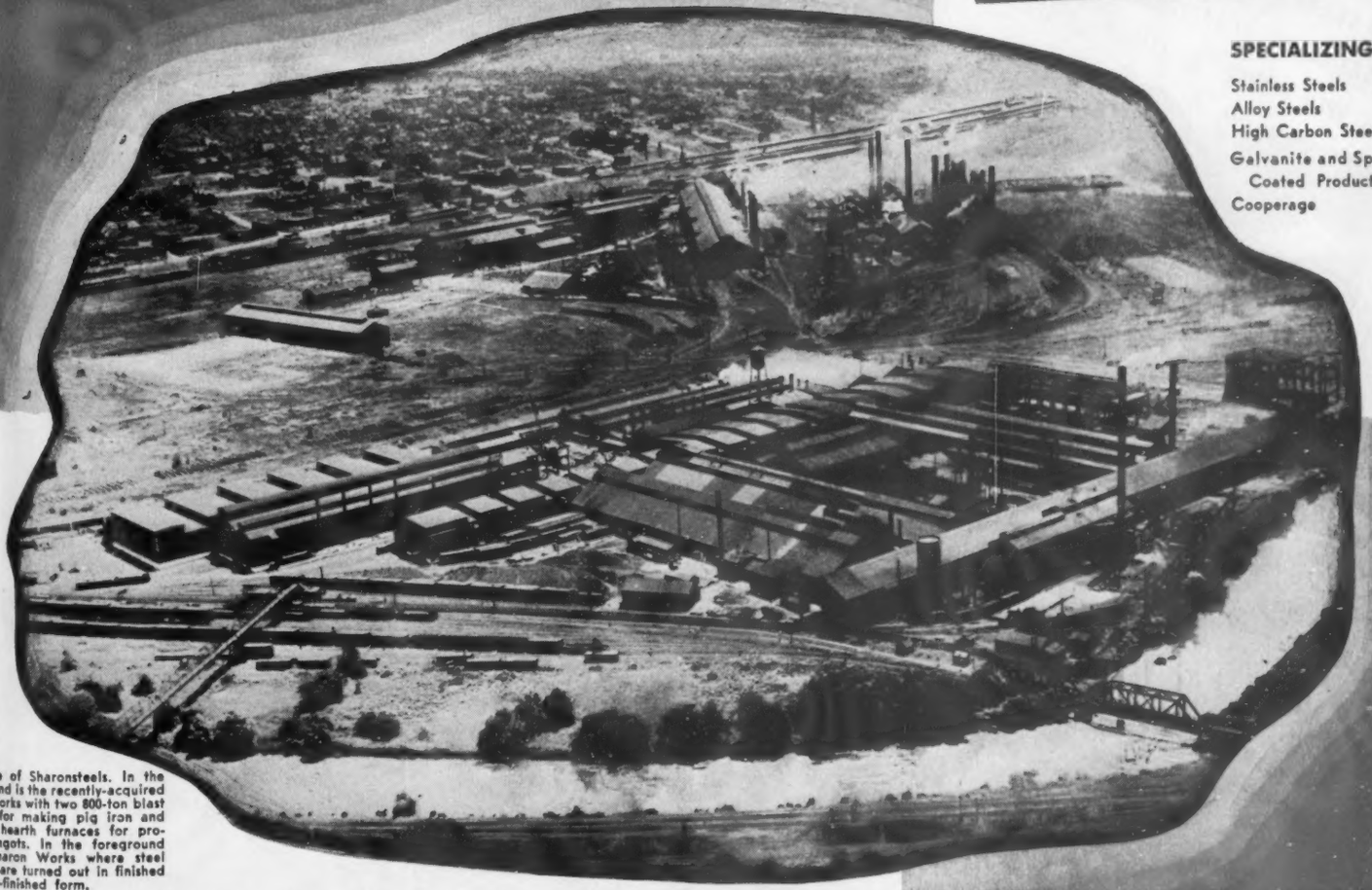


Home of Sharonsteels. In the foreground is the recently-acquired Farrell Works with two 800-ton blast furnaces for making pig iron and open hearth furnaces for producing ingots. In the foreground is the Sharon Works where steel products are turned out in finished and semi-finished form.

SHARON STEEL CORPORATION

Sharon, Pennsylvania

DISTRICT SALES OFFICES:

Chicago, Ill., Cincinnati, O., Cleveland, O., Dayton, O., Detroit, Mich., Indianapolis, Ind., New York, N. Y., Philadelphia, Pa., Rochester, N. Y., San Francisco, Calif., St. Louis, Mo. Canada: Montreal, Quebec; Toronto, Ontario.

Subsidiaries: THE NILES ROLLING MILL COMPANY, NILES, OHIO • THE DETROIT SEAMLESS

HOW Alliance KEEPS CRANES FROM GETTING O

Operating and maintenance men judge crane performance by the number of years of trouble-free service. Alliance always has rated high for quality construction, as exemplified by these features:

1. To prevent entrance of dirt and leakage of lubricant, all bearings (brass and roller) are completely sealed.
2. To prevent bearings getting out of line and to avoid loosening of bolted connections, trolley frames are a one-piece steel casting or weldment.
3. To prevent cranes getting out of square and twisting of girders, end connections of girders are of ample section.
4. To make maintenance easy, all working parts are easily accessible.
5. To help prevent accidents, Alliance provides full vision cabs and convenient location of controls.

Alliance, world's largest builder of the world's largest cranes, builds many types of load handling equipment for mills.

OLE CRANES · GANTRY CRANES ·
ORGING MANIPULATORS · SOAKING
PIT CRANES · STRIPPER CRANES ·
SLAB AND BILLET CHARGING MACHINES
· OPEN HEARTH CHARGING MACHINES

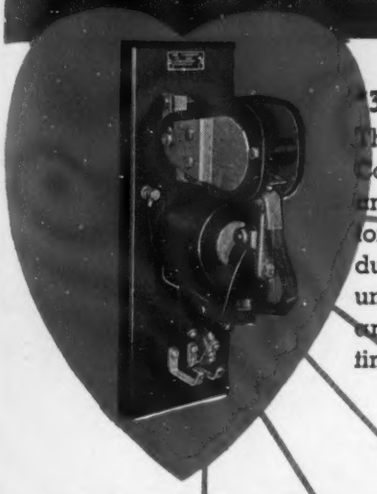
Call ALLIANCE FOR CRANES

THE ALLIANCE MACHINE COMPANY • ALLIANCE, OHIO

ARMY E NAVY

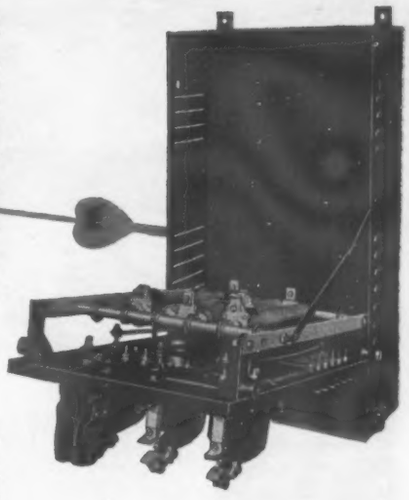
PITTSBURGH, PA., OFFICE — 1622 OLIVER BLDG.

BULLETIN 7400 VARITIME CONTACTOR *is the* HEART *of all* CLARK HEAVY DUTY DC AUTOMATIC STARTERS



"3C" BULLETIN 7400 VARITIME CONTACTOR

The heart of these starters is the "3C" Varitime Contactor—which incorporates *within itself* an adjustable time delay—making it ideal for service as an accelerating starter on heavy duty DC motors. Since accelerating relays are unnecessary, wiring is simplified, fewer parts are required, and maintenance reduced—timing element needs no service or repair.



A. Bulletin 5370, Size 5, Type B, Form 3 AL Non-Reversing, Dynamic Braking, Adjustable Speed Starter,—cover removed. This control has Type FL (Field Loss) Relay, for preventing motor run-away if field should burn out or in some way become de-energized.

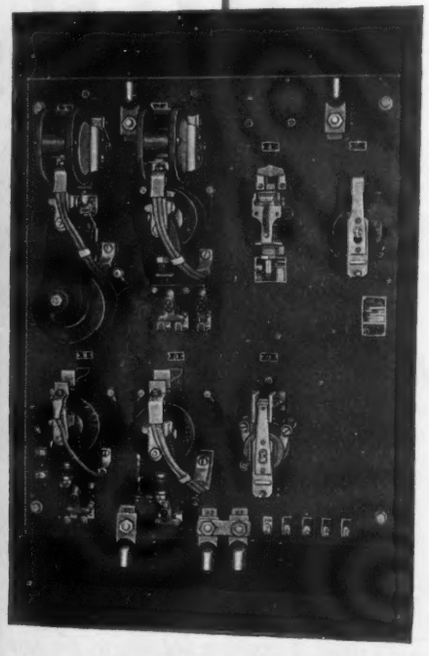
B. Bulletin 5370, Size 2 Type RB, Form 2L Reversing, Dymamic Braking Starter. Bulletin 5370 Starters are suitable for use with Shunt or Compound Wound DC Motors on drives where frequent starting is required as with various machine tools, fans, blowers, pumps, etc.,

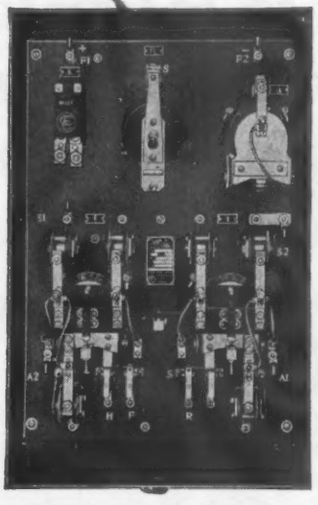
C. Bulletin 5370, Size 2, Type P, Form 2, Non-Reversing Constant Speed Starter. Illustration shows control without enclosing cabinet. NEMA Type 1 enclosing cabinets are standard on Bulletin 5370 Starters, but other types of enclosures are available for specific applications.

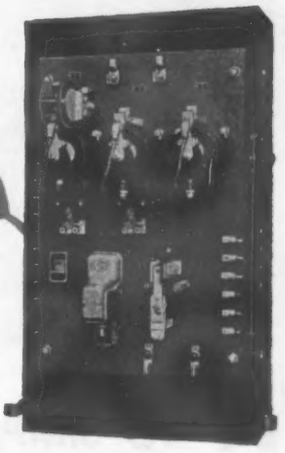
D. Bulletin 5380, Non-Reversing Adjustable Speed Heavy Duty Mill Type Automatic Starter—cover removed. These starters are used in heavy-duty applications and in connection with Shunt or Compound Wound, Constant or Adjustable Speed DC Motors.

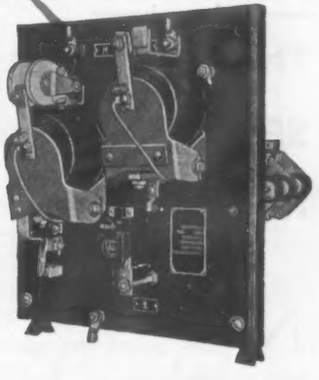
E. Bulletin 5380 Starter, same as "D", showing swing-out arrangement on the slate permitting easy access to rear of panel for routine maintenance.

Ask for descriptive Bulletins 5370 and 5380



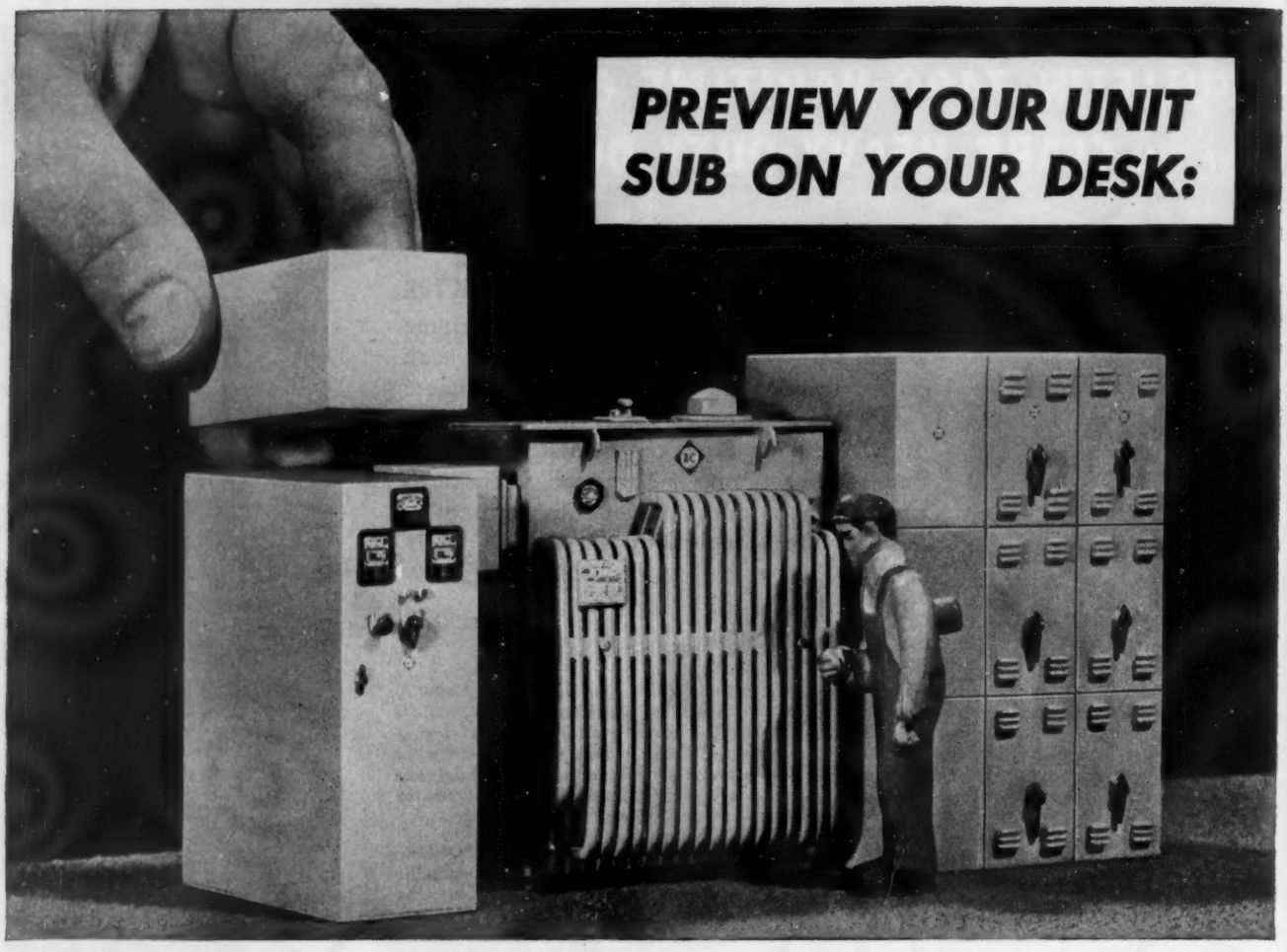






THE CLARK CONTROLLER CO.

1146 EAST 152nd ST., CLEVELAND 10, OHIO • EVERYTHING UNDER CONTROL



Buy From Sight,

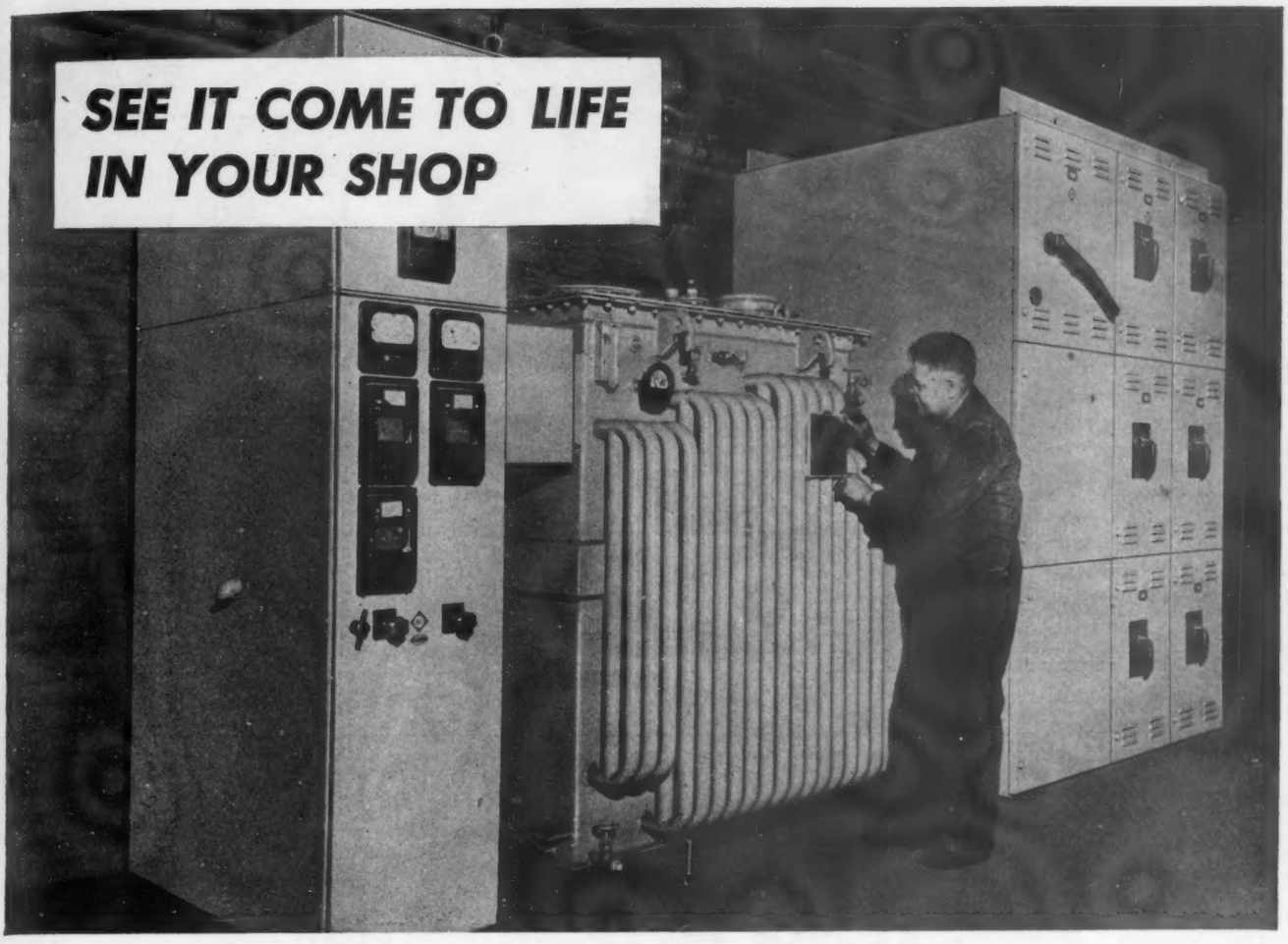
SO SIMPLE! SO PRACTICAL! SO FAST! — VISUAL PLANNING OF POWER DISTRIBUTION IS NOW POSSIBLE WITH THE HELP OF ALLIS-CHALMERS' "UNIT SUB BUILDER" SET. YOU SEE WHAT EQUIPMENT IS AVAILABLE, HOW IT FITS TOGETHER, HOW THE RIGHT UNIT SUB WILL LOOK IN YOUR PLANT.

NO LONGER is it necessary to bog down in complicated charts and tables while solving power distribution problems.

With the help of Allis-Chalmers' "Unit Sub Builder" Set you can now plan visually, effortlessly, quickly. You can *see* what equipment is available, experiment with various arrangements, make comparisons, build solutions . . . *right on your own desk top.*

What's more: A-C models, accurately scaled ½ inch to 1 foot, are good insurance against costly power distribution planning mistakes. They make it possible for you to *pre-test* your unit sub ideas . . . let you see just what you're getting in terms of dimensions, characteristics, appearance.

You'll get an even clearer picture if models are built up



and Buy Right!

on a floor plan of your plant drawn to the same scale.

All of the elements making up Allis-Chalmers Prefabricated Load Center Unit Substations are contained — in miniature — in the model kit. In addition, there's a "Unit Sub Slide Rule" to simplify breaker calculation and a valuable "Unit Sub Check List" to give you the added planning safety of a double check.

In the comparatively short period Allis-Chalmers' "Unit Sub Builder" Set has been available for assisting power distribution planners, engineers of many leading U. S. firms have taken advantage of its time-saving, trouble-saving benefits. They like the idea of working out solutions to unit sub problems . . . quickly, easily, accurately.

This complete *and proven* service is yours with no obligation. To see for yourself how the models, check list, and slide rule can help you in planning your power distribution system, call your nearby Allis-Chalmers district office.

An A-C field engineer will bring the "Unit Sub Builder" Set, together with the handy slide rule and check list to your office for a showing. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

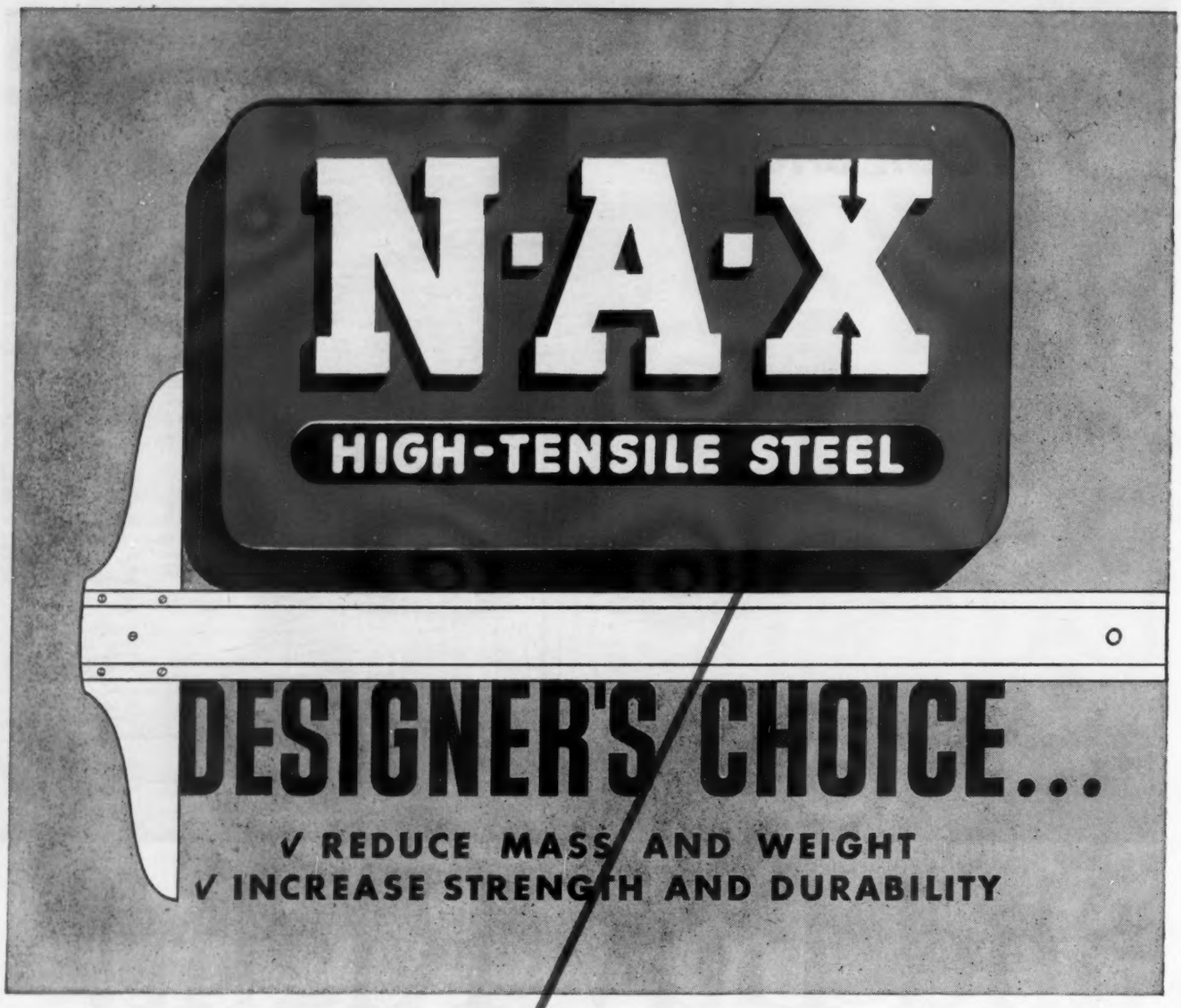
A 1952

—with

ALLIS-CHALMERS

Unit Sub Builder Set

HEAR THE BOSTON SYMPHONY: *Every Saturday Evening, American Broadcasting Co.*



By taking advantage of the high inherent properties of N-A-X HIGH-TENSILE steel—great strength and toughness, exceptional formability, outstanding resistance to impact and fatigue, with good weldability and resistance to corrosion—manufacturers can have their choice of two fundamental improvements in product design:

1 Where reduction of weight means efficiency, lighter sections of N-A-X HIGH-TENSILE steel can be used without sacrifice of strength. Its high properties take the place of mass.

2 Where increased strength and life characteristics are desirable, the use of N-A-X HIGH-TENSILE steel in the same sections will provide a stronger, tougher, longer-lasting product.

Certainly these demonstrable advantages are worthy of your consideration in the conquest of postwar markets.

GREAT STEEL FROM GREAT LAKES

GREAT LAKES STEEL
Corporation
N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

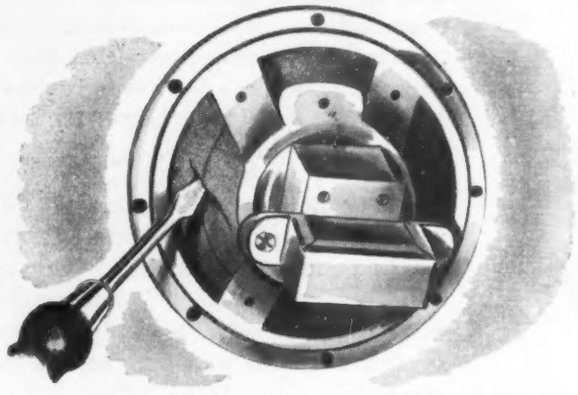
INDEPENDENT INVESTIGATOR'S STUDY SHOWS

How Phillips Screws Saved Emerson Radio $40 Daily Spoilage

THIS INVESTIGATOR from James O. Peck Co., industrial research authorities, is visiting a number of representative plants to get authentic FACTS on assembly savings for you.

GET HIS UNBIASED REPORTS READ THE COMPLETE FACTS!

100 Driver Skids a day eliminated ... at 40¢ a skid!

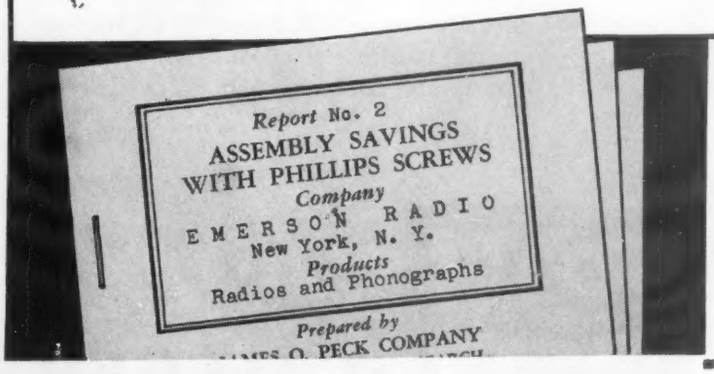


EMERSON RADIO & PHONOGRAPH CORP. use Phillips Screws for one good reason... *they cut costs!* Good example is the daily saving of $40 formerly used up reclaiming loud speaker cones ruined by driver skids from slotted screws.

That's only one way Phillips Screws save. They can be driven faster – allow use of power in place of hand drivers. They drive tighter – fewer and smaller screws can often be used. Burrs and broken screw heads are eliminated, and the ornamental design improves product appearance.

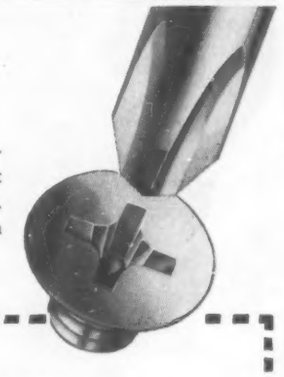
NOW, THESE UNBIASED REPORTS show how these advantages result in savings that add up *big* in yearly assembly records – savings you can't afford to miss with today's squeeze on profits.

THE ASSEMBLY STUDIES COVER ALL TYPES OF PRODUCTS – metal, plastics, wood. The report on Emerson – others now ready – and more to come – make up a practical manual of modern assembly methods, never-before-printed information, inside facts you'd pay good money to get, – and it's yours, now, FREE!



WHATEVER YOU MAKE, THERE ARE SAVINGS IDEAS HERE FOR YOU!

Find out how industry's best assembly experts cut costs! Get these reports, as they are issued. Don't wait... mail the coupon TODAY!



PHILLIPS *Recessed Head* SCREWS

Wood Screws • Machine Screws • Self-tapping Screws • Stove Bolts

27 SOURCES

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International Screw Co.
Lamson & Sessions Co.
Manufacturers Screw Products
Milford Rivet and Machine Co.
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The Steel Company of Canada, Ltd.
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c/o Horton-Noyes
2300 Industrial Trust Bldg., Providence, R. I.

Please send me the reports on Assembly Savings with Phillips Screws

Name .....

Company .....

Address .....

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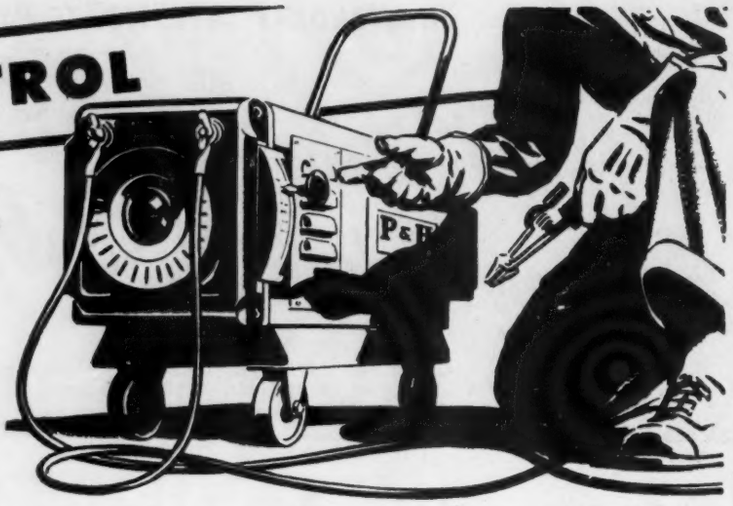
JUST ONE CONTROL

DOES ALL THESE THINGS . . .



1. **P&H** gives you any desired welding heat within the machine's range.
2. Provides automatic response for all classes of work — downhand, vertical or overhead — with bare or coated electrodes.
3. Assures accurate volt-ampere regulation without corrective devices.
4. Eliminates chances of error in heat settings.
5. Makes welding easier — cuts operator training time.
6. Assures better welding results.
7. Cuts welding costs.
8. Saves time — only one quick setting.

P&H Model WA-200
Arc Welder
30-285 Amperes
Capacity

Yes, for downright simplicity — for easy operation . . . for better welding results . . . for thrifty operation — this P&H machine is in a class by itself! Feature for feature, it's your best buy — for day in, year out faithful service.

WSR (Welding Service Range) ratings which tell the exact amount of *usable* welding current — from minimum to maximum capacity. "Visi-matic" calibration — enables you to select instantly the correct current for each of the three classes of electrodes.

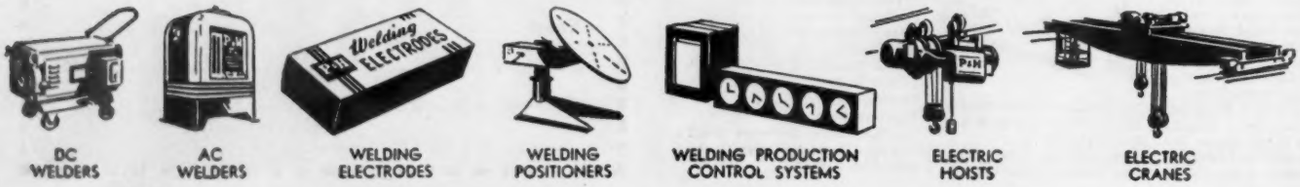
Get all of the facts.
Write for complete information!

Also ask for booklet describing the complete line of P&H Welding Electrodes — including sizes and types for all requirements; fabricating, repair-welding, building up and hard-surfacing.

P&H ARC WELDERS
4411 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION
ARC WELDERS • EXCAVATORS • ELECTRIC CRANES • P&H • MOTORS • HOISTS • WELDING ELECTRODES

A COMPLETE ARC WELDING SERVICE • WRITE FOR BULLETIN R7-3



DC WELDERS | AC WELDERS | WELDING ELECTRODES | WELDING POSITIONERS | WELDING PRODUCTION CONTROL SYSTEMS | ELECTRIC HOISTS | ELECTRIC CRANES

WHY ELECTRO-Silvery?
Keokuk Electro Silvery (high silicon pig iron) is manufactured under complete and constant control ... assuring highest uniform quality. Available in standard and alloy ... 30-lb and 60-lb pigs ... 12½-lb. piglets that can be charged by count. All can be handled by magnet. Ask about them today!
KEOKUK ELECTRO-METALS CO.
Keokuk, Iowa
For 30 Years . . . Electro-Silvery and Other Ferro-Alloys
Sole Agents: MILLER AND COMPANY
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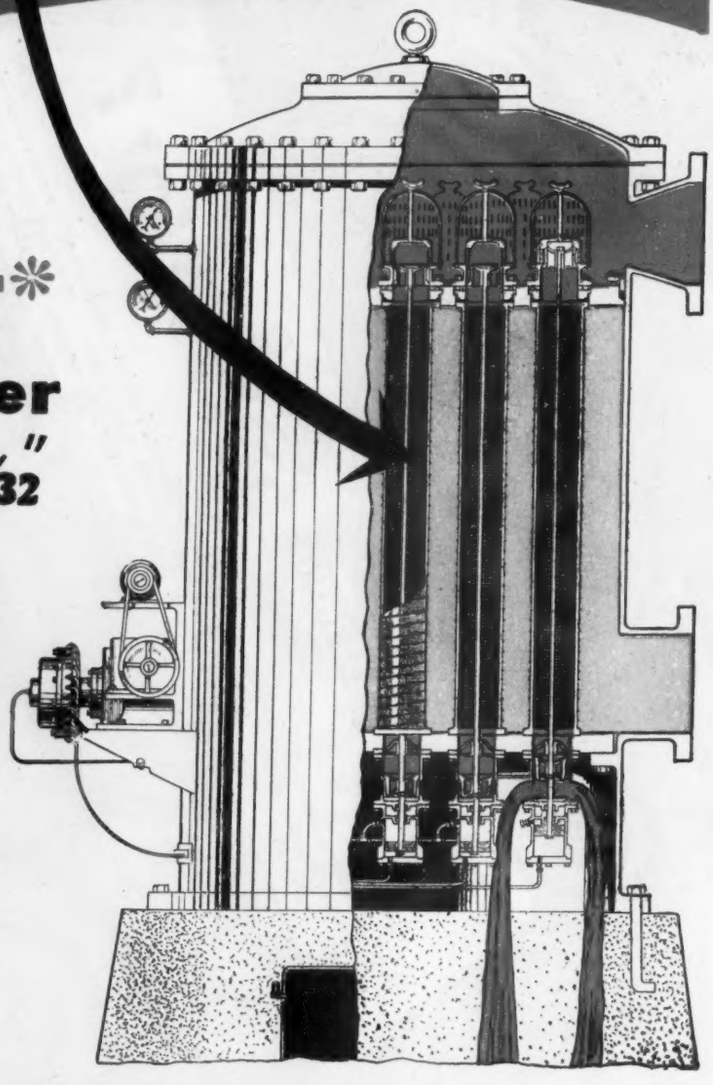
ADAMS AUTOMATIC WATER FILTERS

Remove GRIT and DIRT* from River Water

***15 times finer than 1/32"**

Adams *Poro-Screen* Filters offer a practical answer to large-scale filtration of dirty river water for use in hydraulic equipment. Designed for continuous, automatic operation and requiring a minimum of attention, Adams Automatic Filters supply the required volume of clean water for your operations—water free of dirt and grit which damage bearings, rolls, valves and other equipment. Highly successful on water cooling installations of open-hearth and heat-treating furnaces.

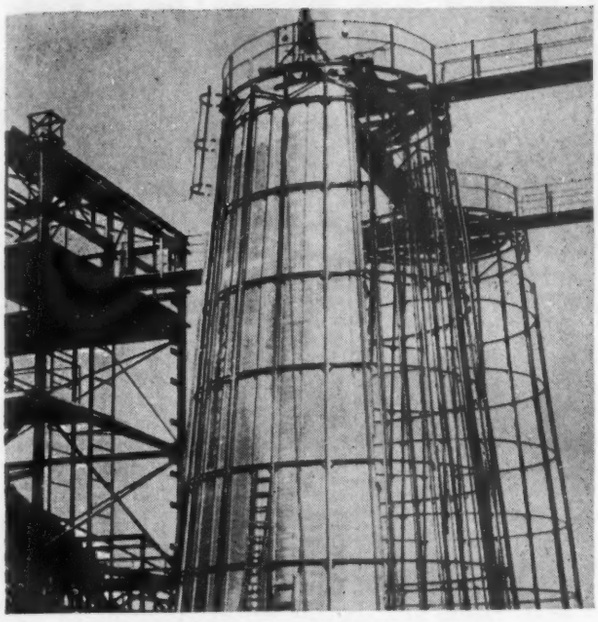
Adams Automatic Filters provide low velocity filtration. Their multiple tube design has no moving clearances, is fully automatic. One tube is back washed at a time while filter is delivering full rated capacity. Adjustable control gives flexibility of back-washing—excessively dirty water more frequently, normal water less frequently. Built in four sizes from 300 gpm. to 2000 gpm. Write for Bulletin 901.



★ R. P. ADAMS COMPANY, INC. ★

75 CHICAGO STREET, BUFFALO, N. Y.

ADAMS PORO-STONE AND PORO SCREEN FILTERS

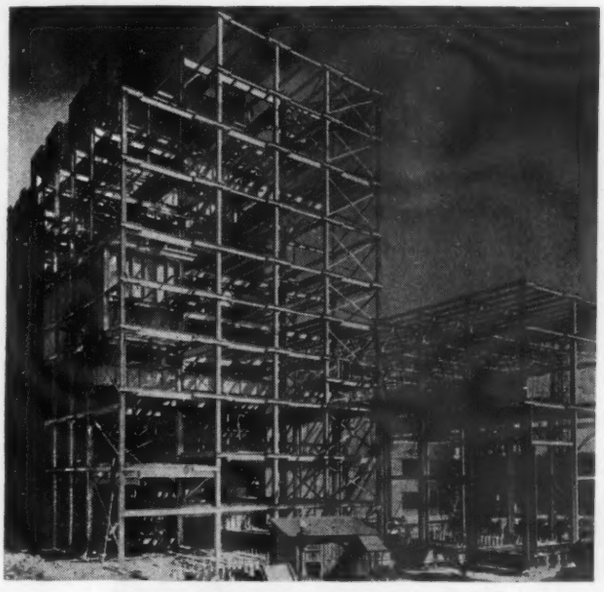


UNUSUAL CONSTRUCTION

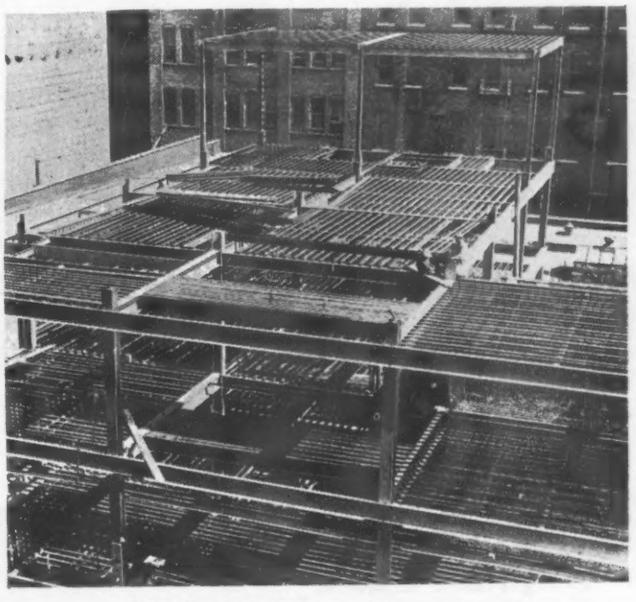
STEEL

CUT TO MANY PATTERNS

Ingalls has adapted and supplied fabricated steel to a wide variety of structural purposes in 35 years of fabricating experience, and has pioneered many new uses and developments. Its competent engineering and fabricating staff, and 3 large, well-equipped plants are able to fill all structural steel and plate work requirements—speedily, efficiently and economically.



INDUSTRIAL BUILDINGS



MULTI-STORIED BUILDINGS

BRIDGES

INGALLS STEEL

THE INGALLS IRON WORKS CO., THE INGALLS SHIPBUILDING CORP., The Steel Construction Co., Birmingham Tank Co. Offices at BIRMINGHAM, New York, Washington, Pittsburgh, New Orleans. Fabricating plants at Birmingham and Pittsburgh. Shipyards: Pascagoula, Mississippi, Decatur, Alabama.

SAFETY "RITE-SPEED" GRINDERS

Take the *Guesswork* out of *Grinding*

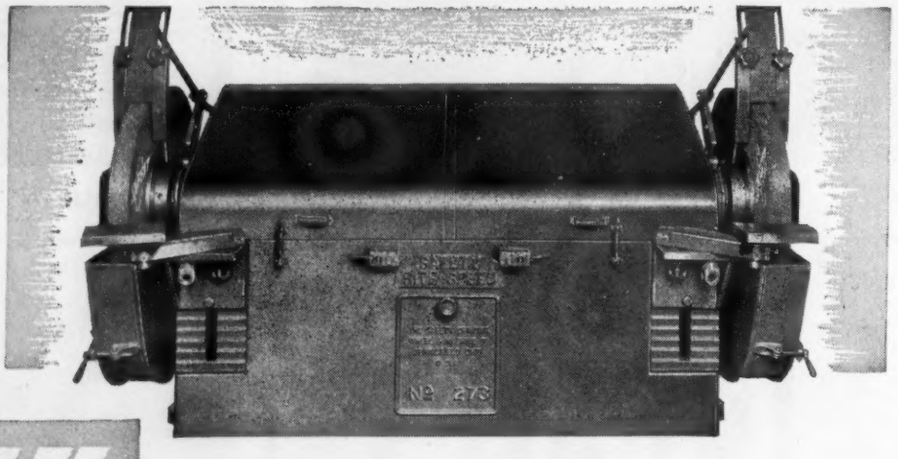
PUT "RITE-SPEED" on the job and the results you get will be exactly what you specified—and practically without thought or concern on your part . . . set the speed at any desired rate and start the Grinder—that's all you need to do!

"RITE-SPEED" then gives you constant, uniform S.F.P.M. as the wheel wears down—the same at the end as at the start of the job. No overspeeding! And "RITE-SPEED" automatically stops when the wheel wears down to a predetermined diameter.

All this only touches upon "RITE-SPEED" cost cutting, labor saving, better grinding benefits. We'll gladly send you the complete story if you say so. We believe you'll find it interesting. Write or wire! Also ask for our new book on Grinding Wheels.

Also Ask About Other SAFETY Products

Swing Frame Grinders
Floor Stand Grinders
Grinding Wheels



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** Sales Offices and * Sales Offices and warehouses for Better Service!*

THE CHOICE OF MEN WHO KNOW RAILROADING

"Built by Magor" is a familiar term in the railroad field, for The Magor Car Corporation designs and builds all types of railway freight cars, including air dump cars and specialized rolling stock. At Magor's Passaic, New Jersey plant, a 30-ton Plymouth gasoline - powered locomotive handles all yard switching and intraplant car movements. This preference for Plymouths, evidenced by men who know railway equipment, is particularly significant to anyone planning the purchase of motive power for intraplant transportation. The complete Plymouth line includes the right locomotive for your plant. Write today for full information.

TRACK HAULAGE IS CHEAPER HAULAGE

PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL MECHANICAL AND DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.

It's the REASON for this Fact that's important

Your *Standard* GATES VULCO ROPES Are Today *OUT-PERFORMING* Any V-Belts Ever Built Before

Early in the war it was found that **no** V-belts then being built by **anyone** could stand the combat-service requirements of the Army's tanks, tractors, and self-propelled big guns. For this unprecedented severity of service, Gates developed and built V-belts far stronger and more durable than any V-belts ever built before—and here is why this fact is NOW important to YOU:—

HERE is the reason

Every improvement developed by Gates for these Army V-belts has also been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.

Here is one of the very few instances in which improvements developed primarily for military use were passed on immediately to you. Ordinarily, that could not be done. Gates V-belts were made an exception because it was recognized that industry needed the best possible V-belts in order to achieve the greatest possible production—and maximum production was one of the nation's vital needs.

That is why Gates has been able to pass on to you, day by day, every V-belt improvement developed for our armed forces during the war—and that is why your Standard Gates Vulco Ropes are today outperforming any V-belts ever built before!

All Gates V-Belts are Built With *The Patented* **CONCAVE SIDE**

Gates

THE MARK OF SPECIALIZED RESEARCH

THE GATES RUBBER COMPANY

Engineering Offices and Jobber Stocks in All Large Industrial Centers

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GATES VULCO ROPE DRIVES

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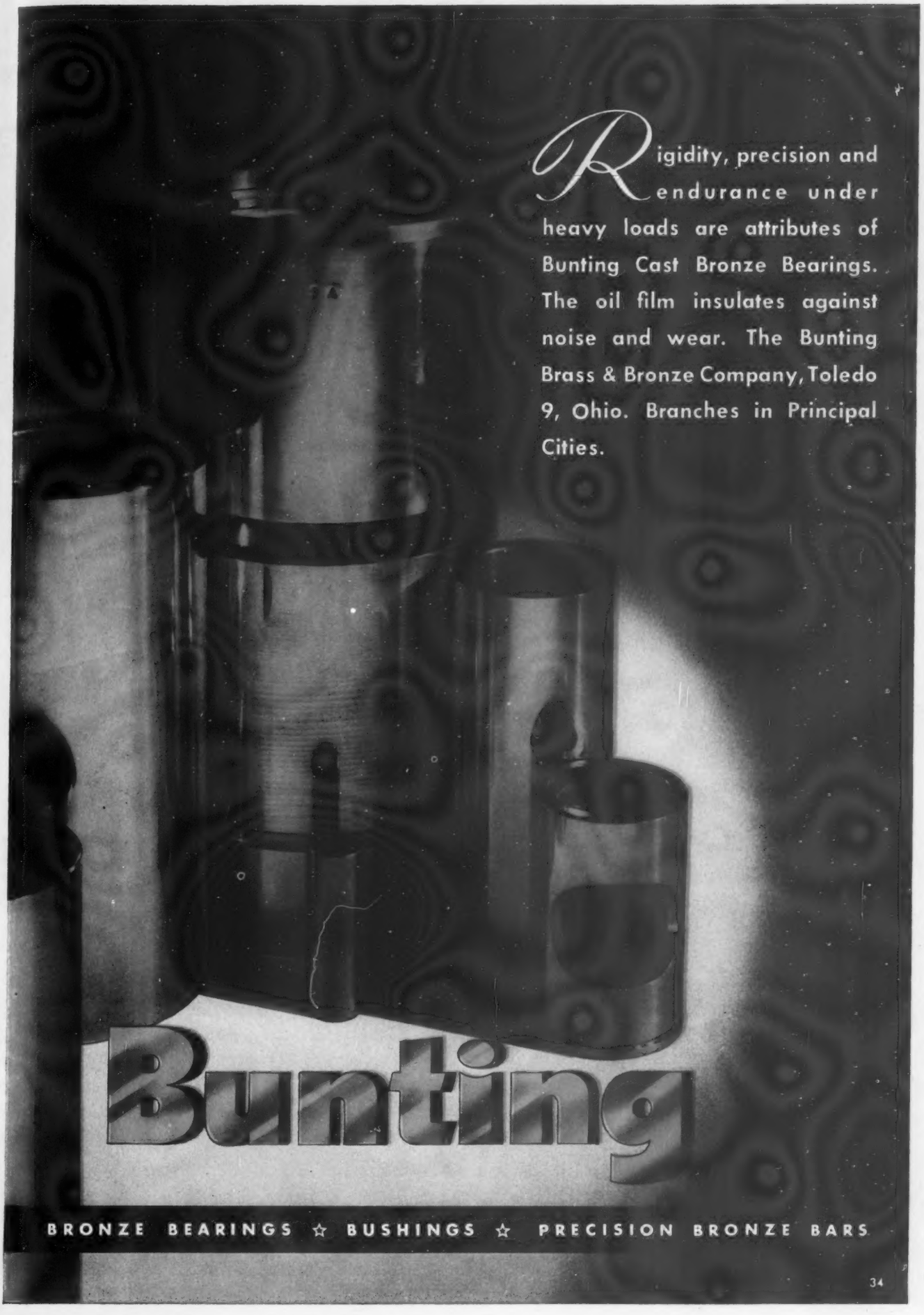
PORTLAND 9, ORE., 333 N.W. 5th Ave. DALLAS 2, TEXAS, 1710 N. Market St. SAN FRANCISCO 3, CAL., 170 Ninth St


Rigidity, precision and endurance under heavy loads are attributes of Bunting Cast Bronze Bearings. The oil film insulates against noise and wear. The Bunting Brass & Bronze Company, Toledo 9, Ohio. Branches in Principal Cities.
Bunting
BRONZE BEARINGS ☆ BUSHINGS ☆ PRECISION BRONZE BARS
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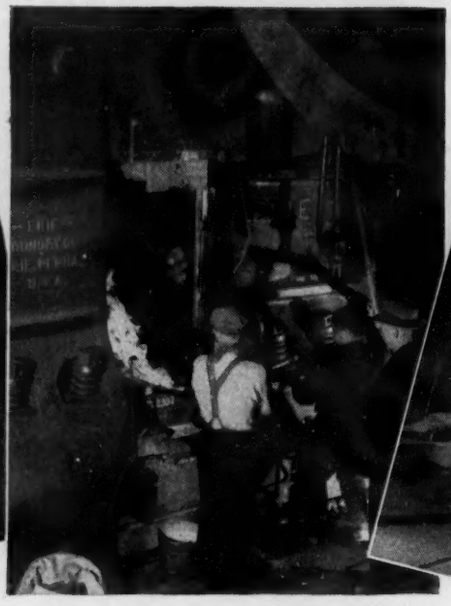
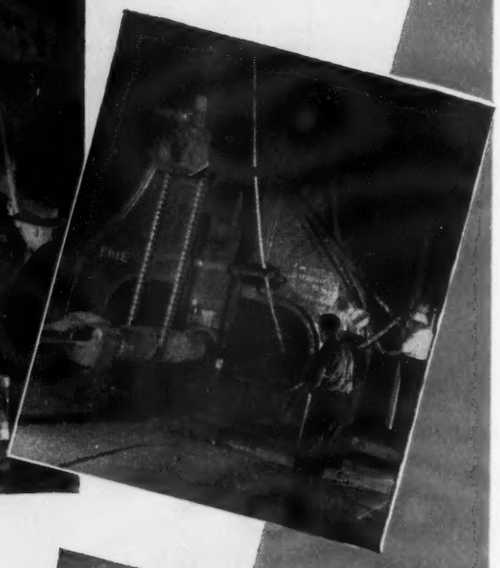
"DIVERSITY"

ERIE builds the right hammer for the job . . . Here illustrated *in operation* are Erie Steam, Air and Board Drop Hammers, Erie Single and Double Frame Forging Hammers, and Erie Trimming Presses . . . products of a half century of hammer design and building "know how".





Erie engineers will consult with you on your requirements . . . write us before purchasing equipment for producing modern forgings.

ERIE

Bulletins giving full details on any or all of these Erie products are available to you for the asking.

ERIE FOUNDRY COMPANY, ERIE, PA.

ERIE BUILDS *Dependable* HAMMERS

When Considering Vanadium Ask for Electromet

Small percentages of Vanadium—0.05 to 0.15 per cent—can be used effectively to give steel extra strength and resistance to fatigue. The results are positive and predictable.

Electromet Ferrovanadium is made from domestic ores mined in adequate quantities at our Corporation mines, and is supplied in high-speed, special, and open-hearth grades.

Vanadium Has Many Applications —Ferrovanadium is used for making fine-grained steels having high dynamic strength, fatigue resistance, and wear

resistance. Such steels include high-speed tool steels, nitriding steels, and many engineering and structural steels. Vanadium oxide and ammonium metavanadate are used for making other vanadium compounds useful to the chemical industries. The costly platinum catalysts formerly used in manufacturing sulfuric acid, for example, may be replaced by a vanadium compound.

Vanadium Improves Transverse Properties—In certain grades of ordnance steels where transverse test requirements are exacting, small amounts of Vanadium (0.05-0.10%) have a beneficial effect on the steel and give more positive results.

Vanadium Steels for the Railroads —Fine-grained, shock-resistant vanadium steels are used for such engine and railroad car castings as main frames, crossheads, pistonheads, wheel centers, driving boxes, rocker arms, equalizers, truck frames, bolsters, and brake rigging. Wrought vanadium steels are used for

helical springs, elliptical springs, and other parts requiring high dynamic strength.

Vanadium Improves Steel Castings —In steel castings a small amount of vanadium . . . usually not over 0.10 per cent . . . refines grain, materially raises yield strength without sacrificing ductility, and greatly increases resistance to shock and fatigue. The addition of 0.10 per cent vanadium to a nickel steel was found to raise the yield strength from 53,450 to 69,900 pounds per square inch and increase the Izod impact from 35.5 to 74.3 foot-pounds.

Vanadium Gives Extreme Toughness To Tool Steels—Most high-speed tool

steels contain vanadium, for it gives these steels better forgeability and improved cutting efficiency. The presence of vanadium helps to maintain cutting properties at elevated temperatures.

• • •

If you need technical help in the use of Ferrovanadium or other ferro-alloys, our field metallurgists will be glad to help you. For more information about these alloys and this service, write for the booklet, "Electromet Products and Service."

ELECTRO METALLURGICAL COMPANY
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ELECTROMET Ferro-Alloys and Metals
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P-14656-2

Yoloy...door to today's modernization

THIS new box car door is fabricated from deep drawing cold reduced Yoloy--the nickle-copper-phosphorus steel that offers a practical solution to the corrosion attack that this type of equipment must endure. This cold reduced low alloy high tensile steel insures better appearance, minimum upkeep and longer life.

The corrosion resistance property makes possible the use of thinner sheets that are also stronger and tougher than the usual carbon sheets. The net result is a light weight door that keeps its shape and is easier to operate through a long service life.

Investigate Yoloy now. Use it for car doors and sides and reduce dead weight as much as 25%. Write, wire or phone for full information on this proven high-tensile steel.

A carload of Yoloy doors leaves the plant of The Youngstown Steel Door Company, on its way to play a part in one railroad's car modernization program.

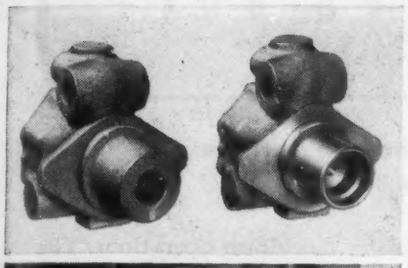
QUALITY YOUNGSTOWN SERVICE

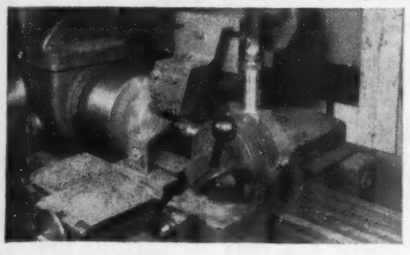
YOUNGSTOWN

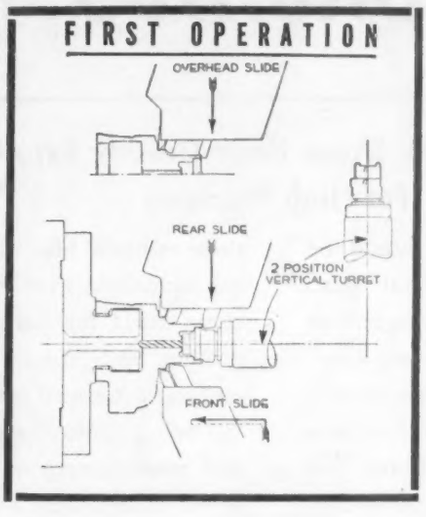
THE YOUNGSTOWN SHEET AND TUBE COMPANY
YOUNGSTOWN 1, OHIO
Export Office . . . 500 Fifth Ave., New York
Manufacturers of
CARBON · ALLOY AND YOLOY STEELS
Pipe and Tubular Products · Sheets · Plates · Conduit · Bars · Electrolytic Tin Plate · Coke Tin Plate · Rods · Wire · Nails · Tie Plates and Spikes

HOW MULTIPLE TOOL TURNING INCREASED PRODUCTION OF PUMP BODIES

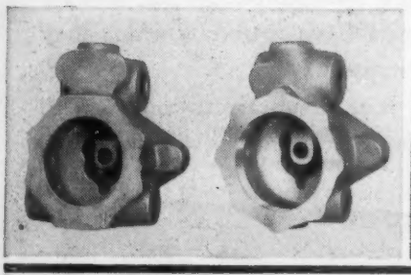
TWO SUNDSTRAND AUTOMATIC LATHES MACHINE 26 SURFACES TO REDUCE TIME FROM 9.7 MINUTES TO 5.9 MINUTES PER PART

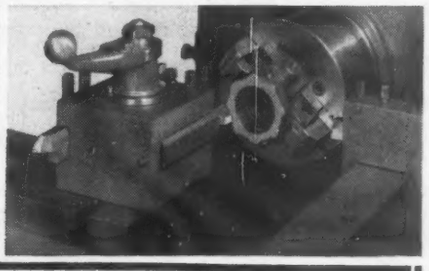


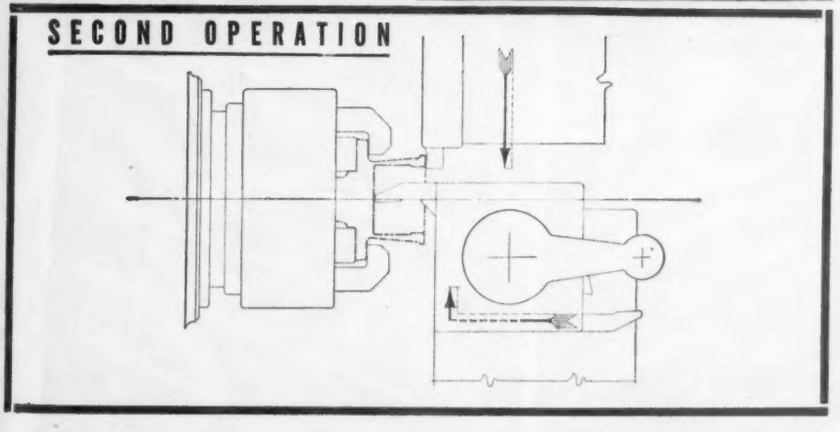




Here's an excellent example of how Sundstrand Automatic Lathes can be multiple tooled to simplify processing and increase production over other turning equipment. This cast iron part formerly required 3 operations to do the turning, boring, facing and drilling of the center hole at a rate of 9.7 minutes per part. Changing the job to Sundstrand Automatic Lathes with multiple tooling made it possible to do the same machining in 2 handlings of the part and reduced the time per part from 9.7 minutes to 5.9 minutes. In addition to this profitable increase, parts are consistently duplicated accurately and the operator's duties simplified due to the automatic machine cycle.







MACHINE DATA

FIRST OPERATION

MODEL 10 SUNDSTRAND AUTOMATIC LATHE

- Rough and finish turn 2 hub diameters, rough and finish face and undercut shoulder, rough and finish bore, counterbore and face inside shoulders, face end, chamfer, drill center hole from solid.
- T. C. tipped turning tools, H. S. S. drill.
- Turret type tool holders for rough and finish cuts.

SECOND OPERATION

MODEL 8 SUNDSTRAND AUTOMATIC LATHE

- Rough and finish bore open end, rough and finish face closed end, rough and finish face flange, chamfer inside diameter of flange.
- T. C. tipped tools.
- Turret type tool holders for rough and finish cuts.
- Note skip feed of front tool slide for rapid traverse between separated surfaces.

FREE! HOW TO CUT TURNING COSTS

This free 44-page booklet contains helpful tips on processing turning jobs, together with illustrations and tooling diagrams. Write for your free copy today. Ask for bulletin 745.

SUNDSTRAND MACHINE TOOL COMPANY

2540 Eleventh Street, Rockford, Illinois, U. S. A.

FUEL UNITS • HYDRAULIC PUMPS • TRANSMISSIONS • FLUID MOTORS • VALVES and CONTROLS

WHAT ABOUT THE *MACHINING* IN THE STEEL *FORGINGS* YOU BUY?

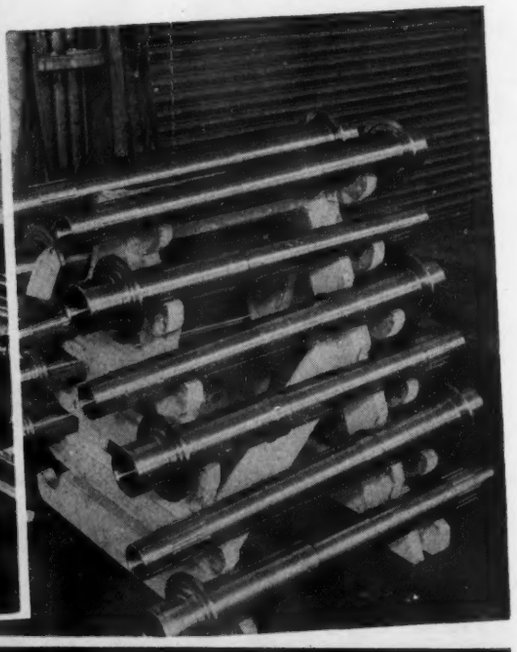
National Forge Machine Shops Have Greatly Expanded Facilities For High Precision

Every other quality in steel forgings should be matched by accuracy and finish in the final finish machining if that forging is to give longevity in service which is so much desired. Adherence to close tolerances to provide proper fitting and fine smooth surfaces to wear well in the bearings and avoid surface ruptures are highly essential. National Forge has built up a reputation for just that kind of machining. Are you getting that kind of superfinish on the forgings you buy?

During the war National Forge expanded its facilities by the addition of the most modern machine tools. Thus they are better prepared than ever to perform these essential high quality machining operations. The list includes a wide variety of types and sizes of machine tools for turning, boring, planing, grinding, drilling, and special machining such as would be required in a well rounded machine shop.

The equipment is capable of machining both large and small pieces of greatly diversified dimensions. These facilities are available not only to machine the forgings which National Forge produces but also for machining on a contract basis materials which may be provided by its customers.

Would it not be to your advantage to consult with National Forge on your machining requirements?



NATIONAL FORGE & ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNSYLVANIA

● If you would visit busy metal-working plants from one end of this great country to the other, you'd find Wells Saws, thousands of them, working; you'd see them cutting every size, shape and type of metal that can be fitted into them; you'd talk to the men who use them and they'd tell you how easy they are to use . . . how convenient they are, how they can be moved from one job to the other to save the time and labor of moving the work to the saw.

They'd tell you also, that you can use a Wells in the storeroom, toolroom and maintenance department, or that you can equip your Wells with a Wells Wet Cutting System for larger production runs.

Perhaps, you would get the idea, as have thousands of Wells users, that here indeed is a wise investment—a handy tool for any metal-working plant. Why not write today for full details.

Specifications:

CAPACITY: Rectangular	**8" x 16"**
(Special Guides)	**5" x 24"**
ROUNDS:	**8" Diameter**
MOTOR:	**½ H.P., A.C. or D.C.**
SPEEDS:	**Selective 60, 90, 130 feet per minute**
WEIGHT:	**Approximately 665 pounds**

Wells Saws — The Sign of Service

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

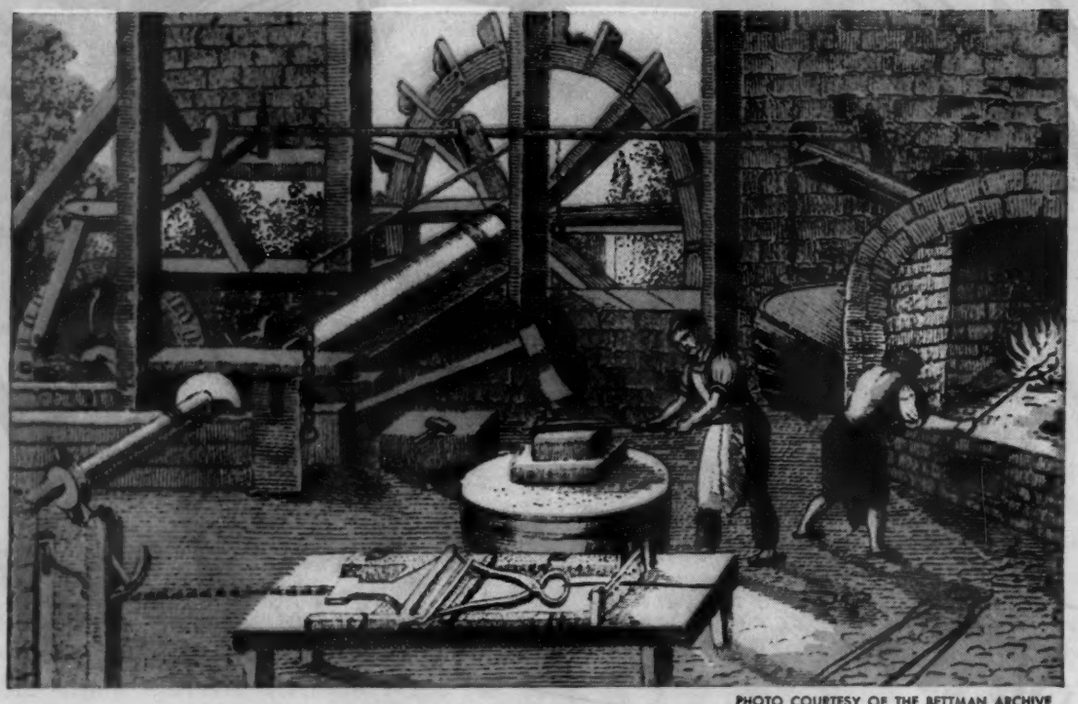


PHOTO COURTESY OF THE BETTMAN ARCHIVE

FROM A METAL-MASTER'S "FAMILY ALBUM"

WHEN FORGE SHOPS LOOKED LIKE THIS

STANDARD STEEL'S present home was a metal production center

This highly mechanized forge shop represented advanced practice in the early 1800's. Power from the giant undershot wheel not only operated the heavy trip hammer, but also pumped the bellows, and provided pull for the ingenious primitive draw-bench in the foreground. Yet when this equipment was a marvel of progress, Standard Steel's ancestor, "Freedom Forge" was already a going concern. As early as 1811 a blast furnace was erected, which was replaced in 1820 with another having a stack 20-feet high and a bosh 7 feet in diameter. Output was from 12 to 15 tons of blooms and bar iron a week

Standard Steel's present forge shop would amaze the metal workers of yesterday. Fourteen steam hammers with capacities of from 3500 to 12,000 pounds and six presses with from 600 to 2500 tons capacity produce 15,000 tons of locomotive forging and 30,000 tons of miscellaneous forgings annually. Any pressed or hammered forging up to 25 tons weight can be handled.

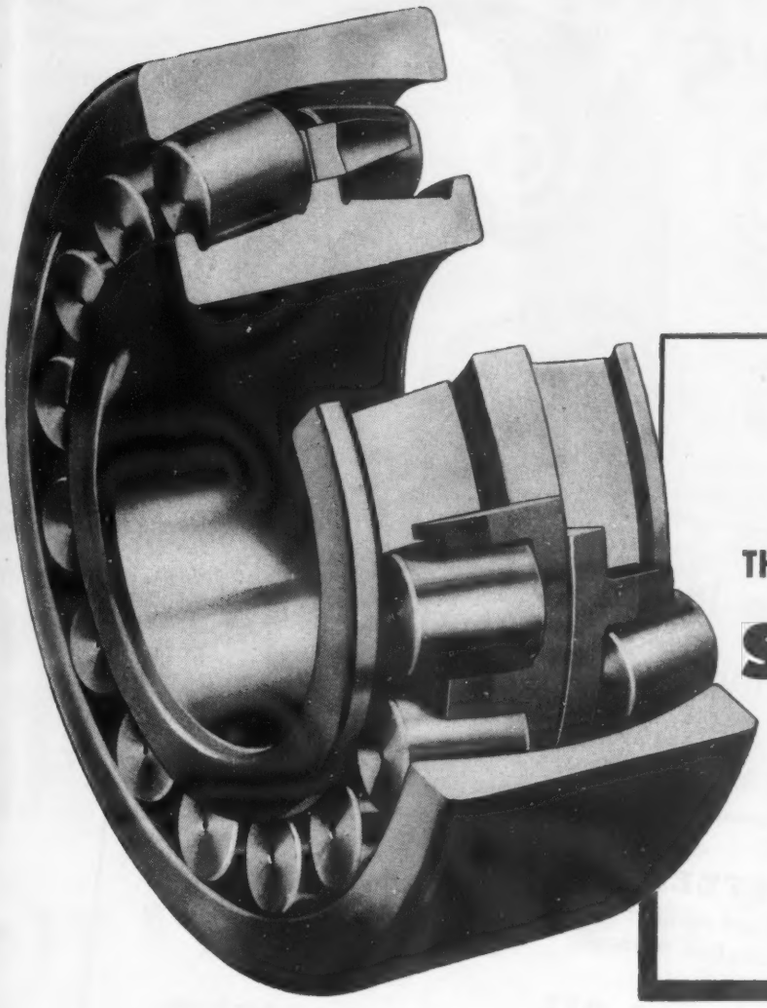
Whenever you need forgings or castings, remember that 151 years of accumulated experience plus complete modern facilities are waiting to serve you here. To simplify your problems, "Standardize on Standard."

BLW THE BALDWIN GROUP **BALDWIN**

FORGINGS AND CASTINGS

The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U.S.A. Offices: Philadelphia, New York, Chicago, St. Louis, Washington, Boston, San Francisco, Cleveland, Detroit, Pittsburgh, Houston, Birmingham.

"STANDARDIZE ON STANDARD" FOR YOUR FORGINGS AND CASTINGS



Announcing

THE TORRINGTON SELF-ALIGNING

SPHERICAL ROLLER BEARING

In addition to the many advantages provided by Torrington's proficient engineering and precision manufacturing, the new Torrington Spherical Roller Bearing offers these features:

- Self-Alignment
- Two-Directional Thrust
- High Radial Capacity
- High Thrust Capacity
- Unit Construction for Easy Installation

To meet the increasingly exacting demands of industry, Torrington has added to its regular line a bearing specifically adaptable to heavy-duty performance... the Self-Aligning Spherical Roller Bearing.

This new bearing will be available in a full range of sizes from 1.5748" bore and up. It is backed up by the same specialized engineering knowledge which for years has made Torrington's Bantam Bearings Division a leader in the design and construction of custom-built bearings. For further information write for our Bulletin No. 100A.

THE TORRINGTON COMPANY • BANTAM BEARINGS DIVISION
SOUTH BEND 21, INDIANA

TORRINGTON BEARINGS

SPHERICAL ROLLER • STRAIGHT ROLLER • TAPERED ROLLER • NEEDLE • BALL

HOUGHTON'S BIG 6 FOR '46

New metal processing ideas ... production-proven

NEW HARDENING SALT
Inhibited to provide automatic rectification.

NEW HIGH SPEED STEEL SALT
Combined with carbon-rod rectifier which prolongs pot and electrode life, at low cost. Salt consumption reduced.

NEW "HOT" QUENCHING OIL
Usable up to 450° F., preventing distortion, yet enabling full hardness.

NEW ANTISEP SOLUBLE OIL
For cutting and grinding, combining antiseptic and remarkable cleansing powers . . . no reservoir residue, no rusting of work at high dilutions.

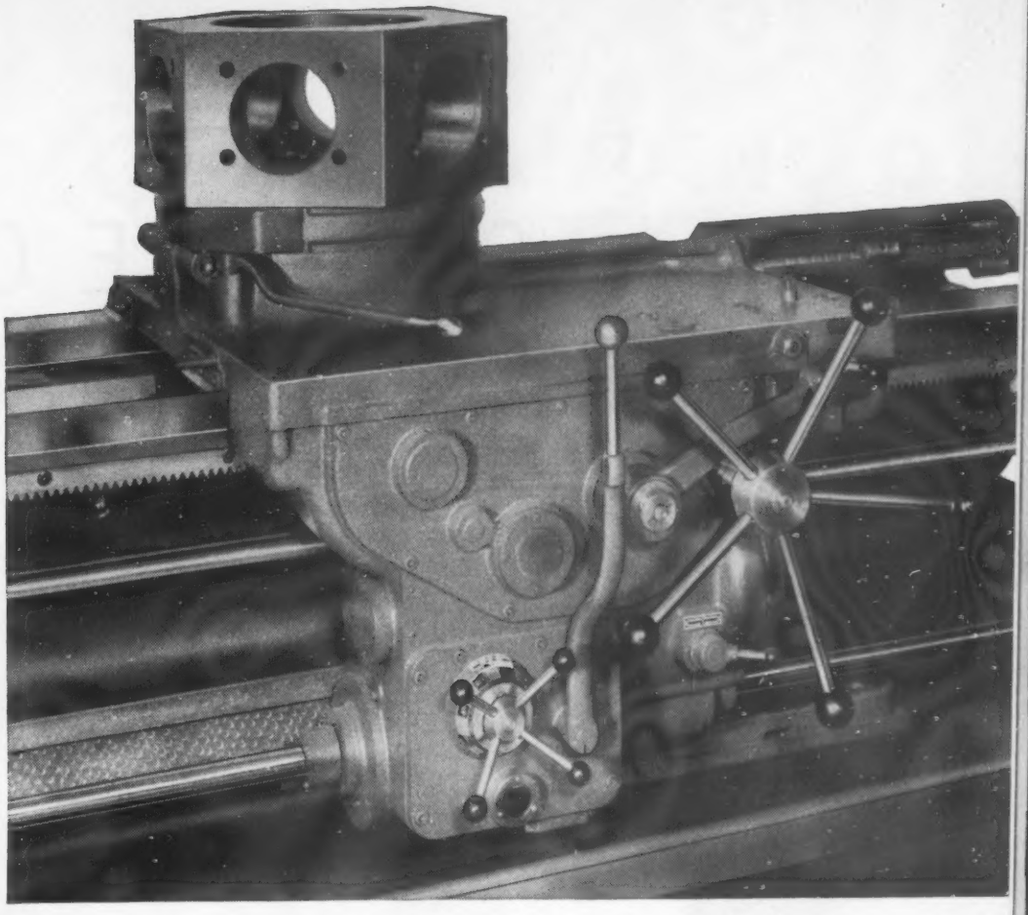
NEW DRAWING COMPOUNDS
Six aids to ease metal drawing, stamping or punching, protecting dies and work. A complete series from heavy pigmented compounds to light oil.

NEW RUST PREVENTIVES
Based on war experience; intended for the peace-time job of inhibiting against corrosion. Special attention given to fingerprint suppression.

These are headliners of the Houghton line for '46 . . . some born out of war, some developed since the ending of war shortages released critical materials. For heat treating and metal processing, depend on Houghton's 81-year background and expert technical aid. E. F. HOUGHTON & CO., Philadelphia and all principal cities.

HOUGHTON PRODUCTS FOR THE METAL INDUSTRIES

LONG SADDLE



—WIDE STRADDLE!

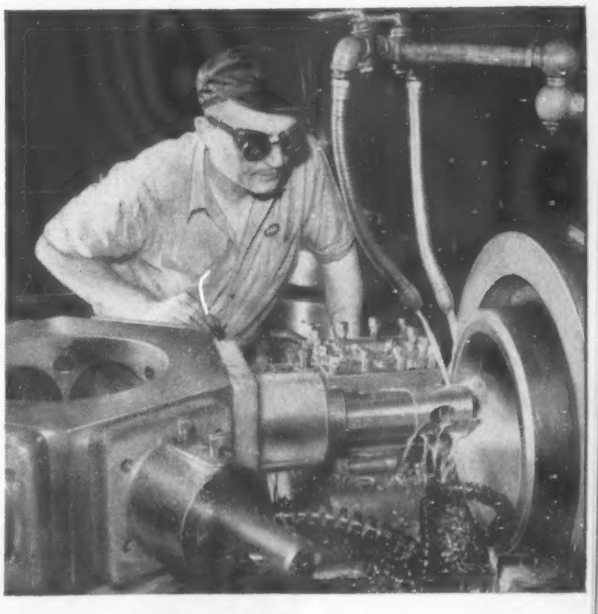
for

fast, heavy, accurate cuts!

Here's one of the reasons why Gisholt heavy duty turret lathes make smooth work of the toughest cuts. It's the design of the Gisholt saddle that provides a firm turret seat—that assures firmly held, chatter-free tools.

It starts with ample length of the saddle and a wide straddle over the ways to assure maximum rigidity and freedom from vibration. With ample bearing surface on block type ways, rigidity is further enhanced by square lock construction and adjustable gibs. Moreover, this accuracy is permanent because Gisholt's ways are of hardened steel, providing a surface that is virtually wear-proof on all sides.

It all adds up to dependable accuracy down through the years—a better investment in high production turret lathe equipment. Ask for literature.



Extreme rigidity is required where tools must take heavy cuts, like the Gisholt 4L shown above, simultaneously facing with the square turret and boring with the hexagon turret.

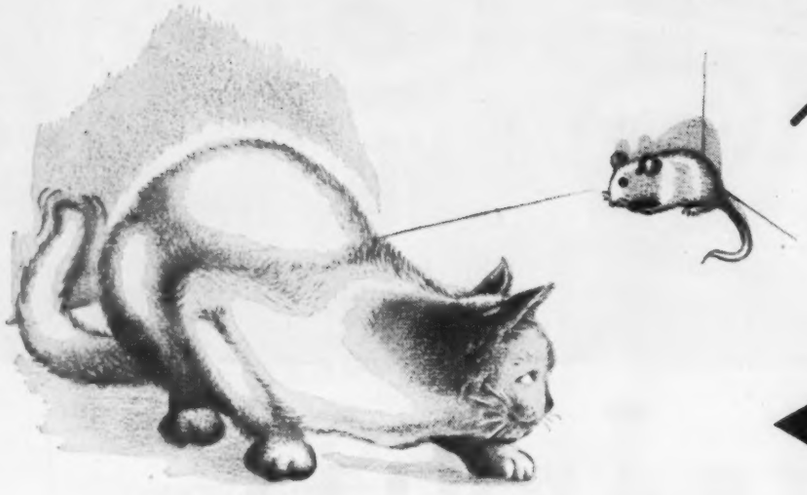
GISHOLT MACHINE COMPANY
1217 E. Washington Avenue • Madison 3, Wisconsin

Look Ahead . . . Keep Ahead . . . with
Gisholt Improvements in Metal Turning

GISHOLT

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

COMPLETE CONTROL

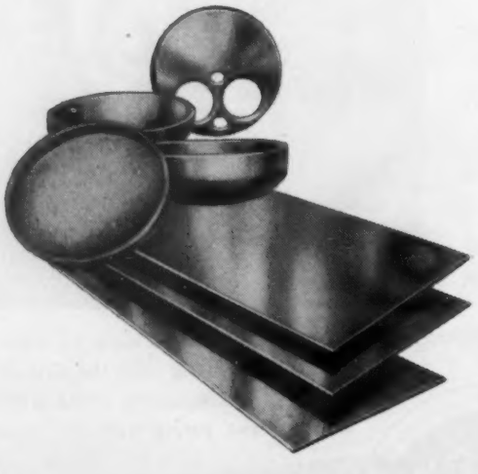


WORTH

Absolute control of every process from the alloying of the metals in our seven Open Hearths, to the final product, makes possible the finished excellence, uniformity and quality of Worth steel. Plates and heads for fired and unfired pressure vessels, locomotives, tanks, vats, chutes, flues, bulkheads, buoys, kilns, uptakes, hoods, gates, ramps, autoclaves, tank cars, machine bases, machine parts, gas holders, platforms, bubble towers, boilers, water heaters, caissons, pipe, etc.

Steel Plates up to 150″ wide; Flanged and Dished Heads from 9½″ to 216″ O.D.; in thickness from 3/16″ to 4″.

We suggest . . . before you place your next order . . . investigate Worth Steel Plates and Heads.



STEEL PLATES; FLANGED AND DISHED HEADS

WORTH STEEL COMPANY · Claymont, Delaware

Knock-Out EXPANDING MANDRELS

They're fast! They're accurate! They're economical!

CAN BE PURCHASED SINGLY OR IN SETS

MODEL NO.	CAPACITY	MODEL NO.	CAPACITY
M0	3/8" to 1/2"	M36	1 3/32" to 1 1/16"
M1	1/2" to 11/16"	M45	1 1/16" to 2 1/32"
M2	11/16" to 1"	M46	2 1/32" to 2 1/2"
M3	1" to 1 1/16"	M5B	2 1/2" to 3 1/4"
M4	1 1/16" to 2 1/2"	M5C	3 1/4" to 4"
M25	11/16" to 27/32"	M55	3 1/4" to 4 3/4"
M26	27/32" to 1"	M6B	4" to 4 3/4"
M35	1" to 1 9/32"	M6C	4 3/4" to 5 1/2"
		M7	2 1/2" to 5 1/2"

IF IT'S MADE BY LEE
IT'S A *Knock-Out*

SEE YOUR NEAREST DISTRIBUTOR

OR WRITE TO K. O. LEE CO.

1137 1st AVE. S. E., ABERDEEN, SO. DAK.

SAVE TIME AND COST

BY ORDERING FERRY CAP PRODUCTS BY NAME

Simply Specify

You can save time, effort and cost by ordering Shinyheads and Hi-Carbs by name. No need to write up the order the long way giving unnecessary details. The Ferry Cap trade name, as indicated below, is its own specification and your guarantee.

Simply specify— **Shinyheads NC** **Shinyheads NF**

Shinyheads mean hexagon head cap screws of high carbon C-1038 steel—full finished—bright, shiny heads—NC or NF thread.

Simply specify— **Hi-Carbs NC** **Hi-Carbs NF**

Hi-Carbs mean hexagon head screws of high carbon C-1038 steel, double heat treated, black satin finish, NC or NF thread.

These Ferry Cap products are carried in stock in popular catalog sizes in bulk and in attractively labeled packages. When ordering from your distributor, simply specify Shinyheads or Hi-Carbs or both.

The FERRY CAP & SET SCREW Co.

2159 SCRANTON ROAD • • • • • CLEVELAND 13, OHIO

CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS • SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS

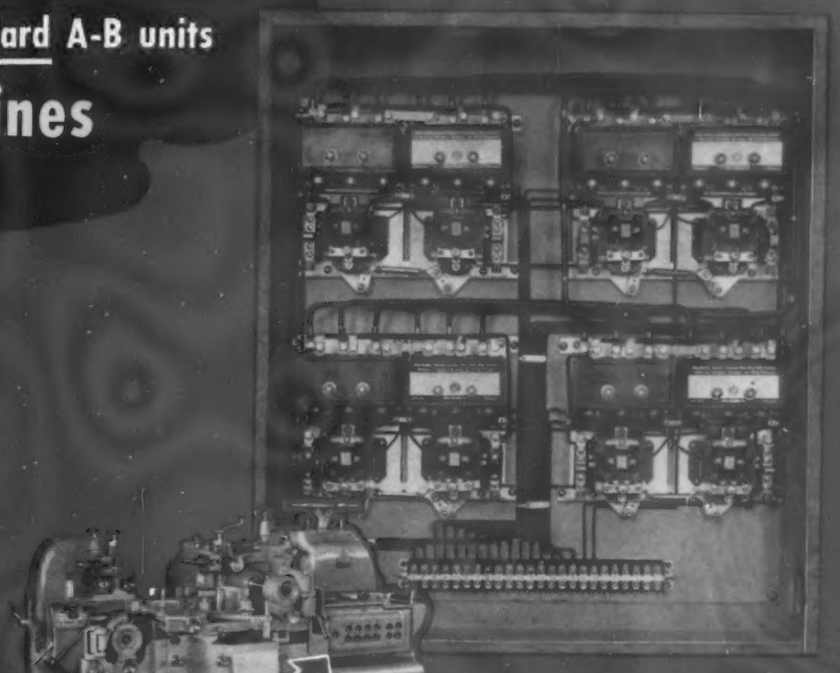
SPECIAL CONTROL PANELS

assembled from standard A-B units

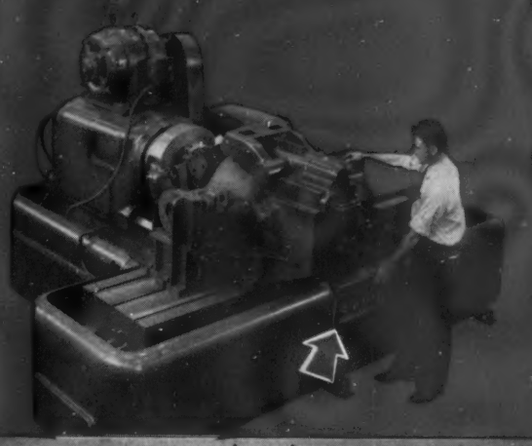
to fit your machines

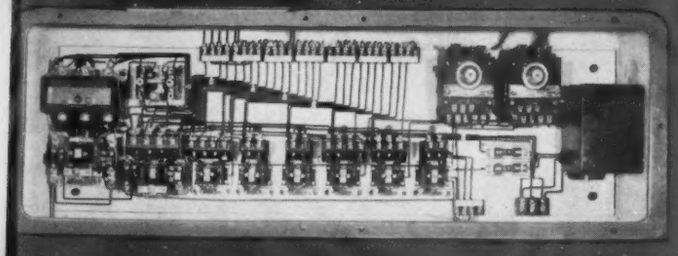
Machine tool builders are concentrating their electric switching units more and more on single control panels . . . using various combinations of standard Allen-Bradley solenoid switches and relays to meet their special operating needs.

Allen-Bradley control engineers are available to machinery builders for control engineering counsel. They will gladly co-operate with you in developing special panels to satisfy the operating requirements of your machine.



MATTISON moulder panel with mechanically interlocked contactors for dual frequency speed control.





CROSS COMPANY axle housing boring machine panel using various types and sizes of Allen-Bradley contactors and relays. Remote control from push button panel near the operator.

KEARNEY & TRAECKER milling machine panel for controlling 50 hp motor and other units of this carbide steel milling machine. Push buttons are mounted upon the milling machine. The panel is mounted separately in a steel cabinet.

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

BULLETIN 609 Manual Starters

BULLETIN 709 Automatic Starters

BULLETIN 712-713 Combination Starters

3 POPULAR LINES

These three lines of Allen-Bradley starters will handle over 90% of all motor control applications:

BULLETIN 609 Manual Starters for manual control of motors up to 5 hp, 220 v and 7½ hp, 440 to 600 v.

BULLETIN 709 Automatic Starters for remote control of motors up to 50 hp, 220 v; 100 hp, 440 to 600 v.

BULLETIN 712 Combination Starters for remote control of motors up to 50 hp, 220 v; 100 hp, 440 to 600 v, plus built-in disconnect switch.

All of these starters are available in a wide variety of enclosures. Because of the compactness of the starter mechanism, all enclosures allow generous wiring space. The white interior illuminates the starter in dark locations. Write for Bulletins 609, 709, and 712-713 today.

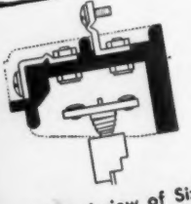
Allen-Bradley Company
1316 S. Second St., Milwaukee 4, Wis.

All 3 have

Double Break Silver Alloy Contacts

There is no contact maintenance with these 3 popular lines of starters. All Allen-Bradley starters are good for millions of trouble-free operations. This is due to the simplicity of construction of the individual switching units. They are unusually rugged in construction.

NEVER CLEAN • FILE • OR DRESS THESE CONTACTS



Sectional view of Sizes 0 and 1 contactors showing double break contacts.

Sectional view of Sizes 2, 3, and 4 contactors showing enclosed arc hood.

ALLEN-BRADLEY

TROUBLE-FREE MOTOR CONTROLS

DIAMOND G CONTROLLED TENSION SPRINGS

The useful life of a spring is the tension built into it. Tension that is exact for each requirement the spring is designed to fill . . . tension that will provide precise control in actual operation . . . controlled tension for better performance.

Every spring produced by Diamond G has Controlled Tension built right in it. Scientific design . . . exacting fabrication . . . precision heat treating and tempering assure Diamond G Springs of meeting the most rigid engineering specifications and tests.

The complete facilities of Diamond G for providing all types of coil and torsion springs offer you a ready source of supply and assure quick deliveries on all quantities. You name your need . . . we'll provide the spring.

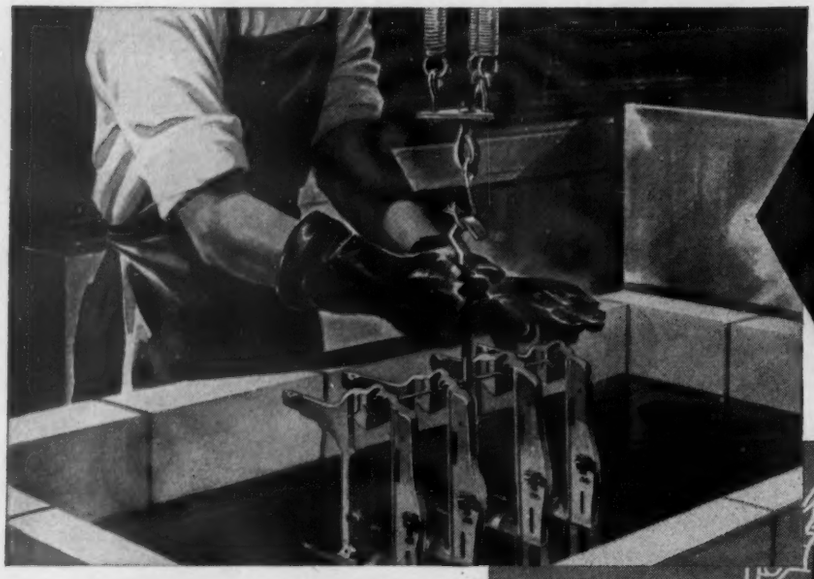
GEORGE K. GARRETT CO., INC.

1114 MORRIS BLDG., 1421 CHESTNUT ST., PHILADELPHIA 2, PA.

MANUFACTURERS OF

DIAMOND G PRODUCTS

LOCK WASHERS • • FLAT WASHERS • • STAMPINGS • • SPRINGS • • HOSE CLAMPS • • SNAP AND RETAINER RINGS



IRIDITE DIPPED!

Immerse parts manually or automatically—on racks or in bulk—for 15 to 60 seconds—quickly dried for immediate handling.

CORROSION WHIPPED!

Iridited parts in finished product will not corrode—are longer lasting—hold paint firmly—like these Woodstock Typewriter components.

Quick Dip Process Puts Finishing Touch On Zinc, Cadmium, Galvanized Products!

If you're manufacturing products of zinc or cadmium plated, galvanized steel or zinc die castings, here's a fast, sure way to beat corrosion . . . and boost sales appeal and profits!

Use Iridite as a final protective finish . . . to balk corrosion while adding colorful eye-appeal to your products. Use Iridite as a paint base . . . to hold paint permanently by preventing formation of soapy, chalky under-layer that destroys adhesion. Use Iridite to reduce costs . . . by combining it with zinc plating to replace more expensive materials.

Iridite *unites chemically* with zinc or cadmium . . . forms a highly corrosion-resistant surface that may be bent or twisted without flaking, chipping or peeling. It does not alter dimensions, can therefore be used on close tolerance parts. Currently available in olive drab, black and transparent Iridite-Bright. For indoor exposure in blue, green, red and bronze.

PROVE IT YOURSELF! Send for free test panel . . . half coated with Iridite, half unprotected. Test it in your laboratory. See the difference. And you'll be on your way to using Iridite! Rheem Research Products, Inc., 1402 Standard Oil Bldg., St. Paul and Franklin Streets, Baltimore 2, Maryland.

BRANCHES—570 Lexington Ave., New York 22; 20 E. Jackson Blvd., Chicago 4; 2411 Sichel St., Los Angeles 31. Distribution in: Waterbury; Detroit; Los Angeles.

RHEEM RESEARCH PRODUCTS, INC.

IRIDITE

Standard Oil Bldg., Baltimore 2, Md.

Reg. U. S. Pat. Off.

CLEVELAND FOUR POINT PRESS

500 TONS CAPACITY . . . . . 108 INCHES BETWEEN UPRIGHTS

This Modern Cleveland Four Point Press is equipped with an electrically controlled hydraulic friction clutch and brake and, in addition, the flywheel is arranged with an air brake to bring it to a quick stop, when necessary. The slide is air counterbalanced and the uprights are provided with openings which permit the feeding of material from right to left.

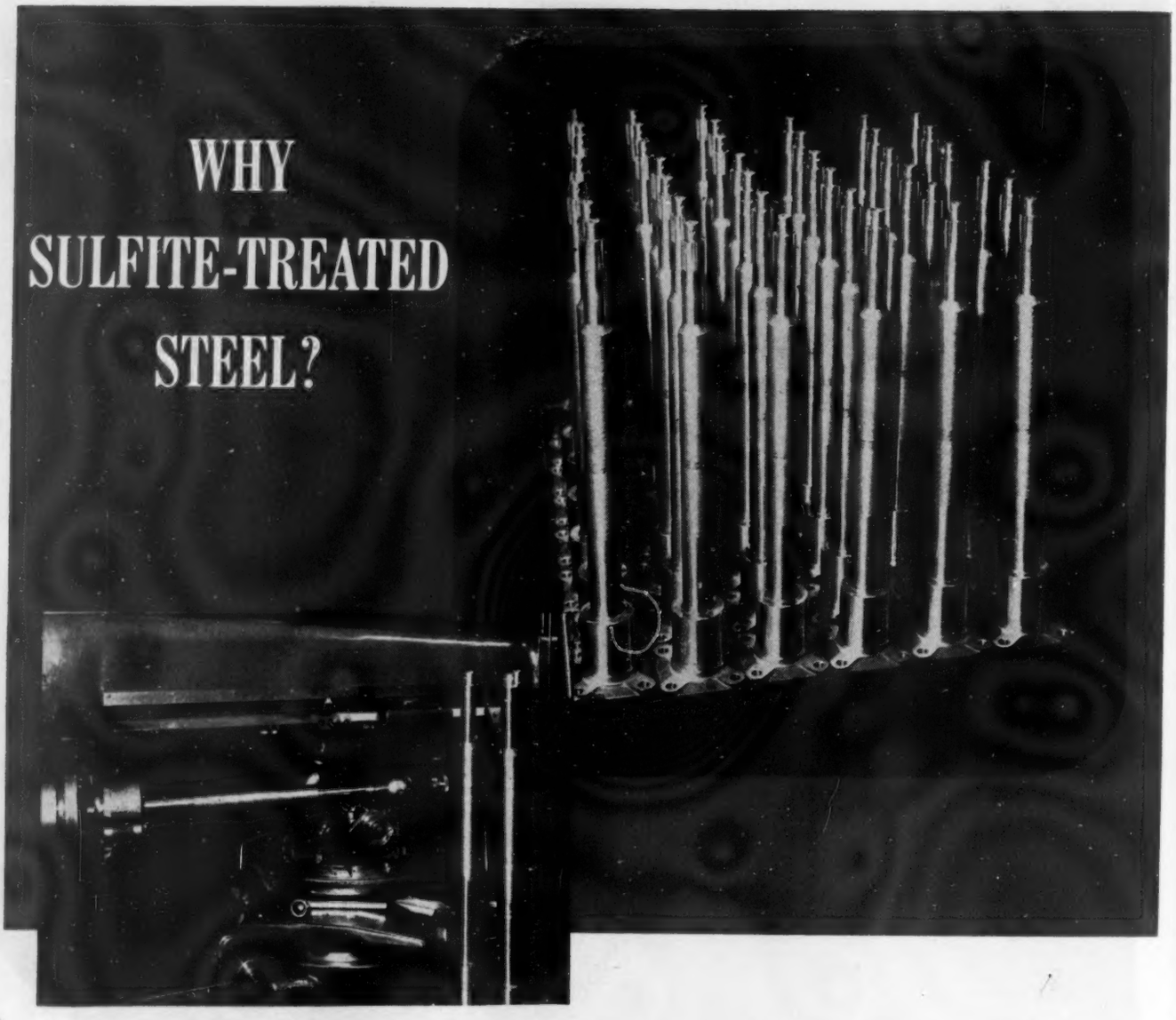
The Press has a 24″ stroke, 6″ adjustment, 60″ shut height and operates at 14 RPM.

This type of Modern Press can be furnished in sizes and capacities to suit requirements.

THE CLEVELAND PUNCH & SHEAR WORKS COMPANY

Cleveland 14, Ohio

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • PITTSBURGH



Just Look at the Record

• Five machining operations on shafts of heat-treated steel! Here's where cutting tools take a beating! But *do* they? Not so you can notice it.

These shafts are made from Wisconsin Sulfite-Treated Steel and just look at the production record. Using Sulfite-Treated Steel, the average pieces per grind on a continuous-turn tool increased from 9 to 35—a 290% increase in tool life! An intermittent-cut tool showed an increase from 7 pieces per grind to 43—a 515% increase! Three other operations showed increases of from 100% to 120%. Remember, these operations are on steel heat-treated to a mean hardness of 300 Brinell.

Only Sulfite-Treated Steel can give you machinability like this with *no sacrifice in physical properties.* An added benefit is a better finished product. You can't afford to delay investigating Wisconsin Sulfite-Treated Steel at your earliest opportunity. Contact the Wisconsin sales and metallurgical staffs. They'll be glad to give you all the facts on magically machinable Sulfite-Treated Steel.

WISCONSIN STEEL COMPANY
(Affiliate of International Harvester Company)
180 North Michigan Avenue Chicago 1, Illinois

WISCONSIN SULFITE-TREATED STEEL

Where do YOU want to go FROM HERE?

● This is the Oster "RAPIDUCTION" *Standard* turning machine No. 601 as it looks before it is adapted to specific needs. This basic machine can be furnished with Worm Drive or Direct Drive and with 4-speed motor or 2-speed motor. Automatic chuck capacity is 1½" (round bar stock).

You Can Start with this *STANDARD* Chassis

Not a single "unwanted" part is on the basic No. 601 machine. From here, our engineers can readily adapt this machine to your EXACT needs. This makes it possible to quickly develop a "special" machine at minimum cost. You gain the economy of a "standard" machine up to the point of where you need to adapt it to "special" conditions.

The Oster No. 601 "RAPIDUCTION" is still obtainable with either the automatically indexed, 6-position turret or with plain saddle and single tool post. But those are only two of many possible adaptations of the basic machine. Either lever or screw feed cross slides are available as well as a wide variety of air or manually operated chucking equipment.

If you believe (as many others have) that this basic machine merits careful consideration, address your inquiry to . . .

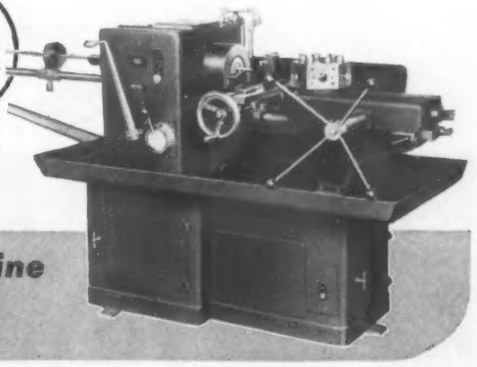
THE OSTER MANUFACTURING CO.
2037 East 61st Street • Cleveland 3, Ohio, U.S.A.

OSTER

"Rapiduction"

The STANDARD Turning Machine with CUSTOM-BUILT Features!

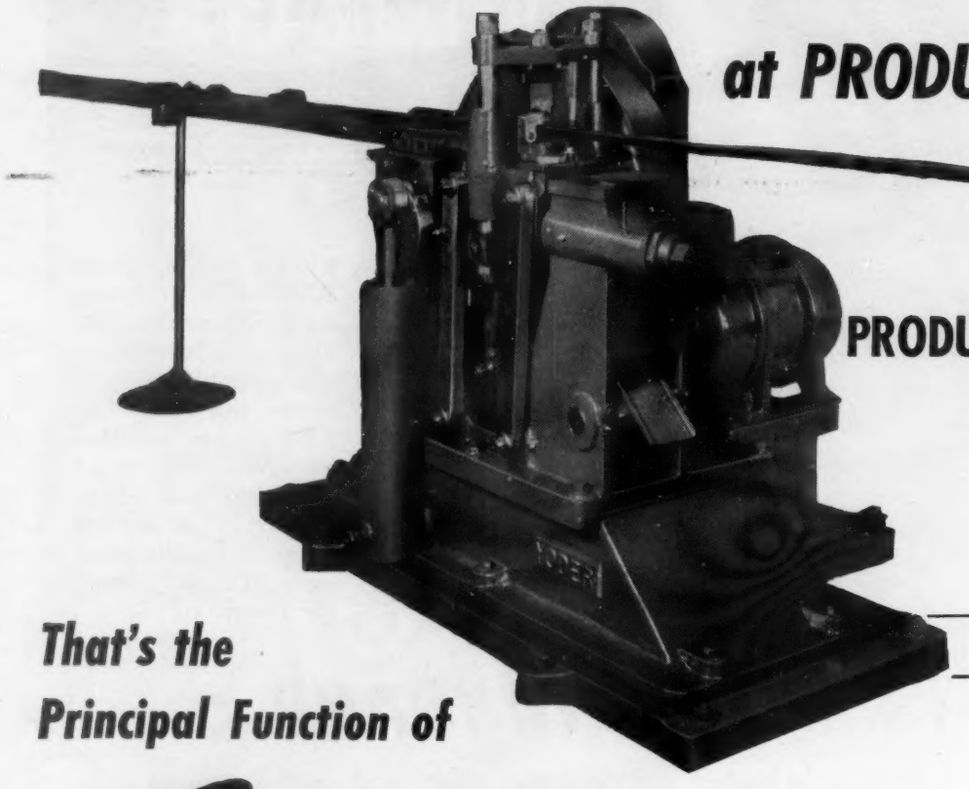
AS A TURRET LATHE



Cutting Off

STRIP, TUBES or FORMED SECTIONS

at PRODUCTION SPEED



THIS IS
MODEL AC-2

with
PRODUCTION ACCURACY

That's the Principal Function of

Yoder

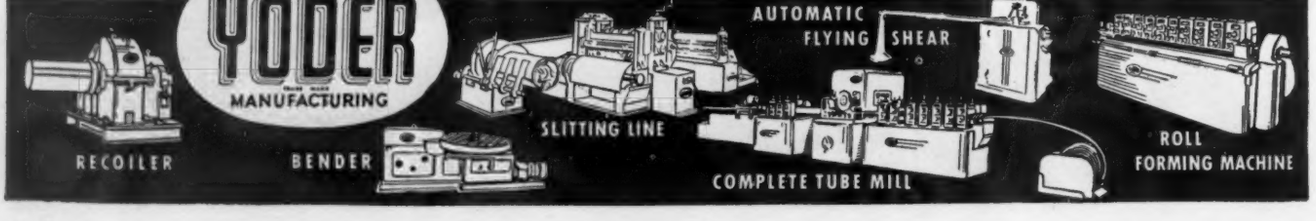
FLYING CUTOFF MACHINES

No other cutoff method equals their speed and economy... Formed or developed cuts made with long-wearing precision dies ... Machines can also be set up for high speed perforating and embossing.

ASK FOR YODER BULLETIN SW-2

THE YODER COMPANY
5502 Walworth Avenue **Cleveland 2, Ohio**

METAL • WORKING • PRODUCTION • MACHINERY
ENGINEERING
YODER
MANUFACTURING



COLD FORGED PARTS

INNUMERABLE parts ordinarily produced by machining operations have been made faster, at less cost, and to equally close tolerances by the application of cold forging methods. This has proved especially true at Allied where production men not only have the best of cold forging equipment at their disposal but also have the experience and ingenuity to determine how such equipment can be adapted to unusual and complicated parts.

If you require parts . . . in quantities of thousands or millions . . . which should be or might conceivably be produced by cold forging, Allied Products should be your most logical source. We'll be glad to send you further information . . . or better yet, submit your part prints to us for quotation.

ALLIED PRODUCTS CORPORATION

DEPARTMENT 2-A
4628 LAWTON AVENUE
DETROIT 8, MICHIGAN

PRECISION • EXPERIENCE • DEPENDABILITY
ALLIED CORPORATION PRODUCTS

SPECIAL COLD FORGED PARTS • STANDARD CAP SCREWS • HARDENED AND PRECISION GROUND PARTS • SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM-HEATED PLASTIC MOLDS • SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES

Why are THESE GEARS used to keep THESE IMPELLERS in perfect step?

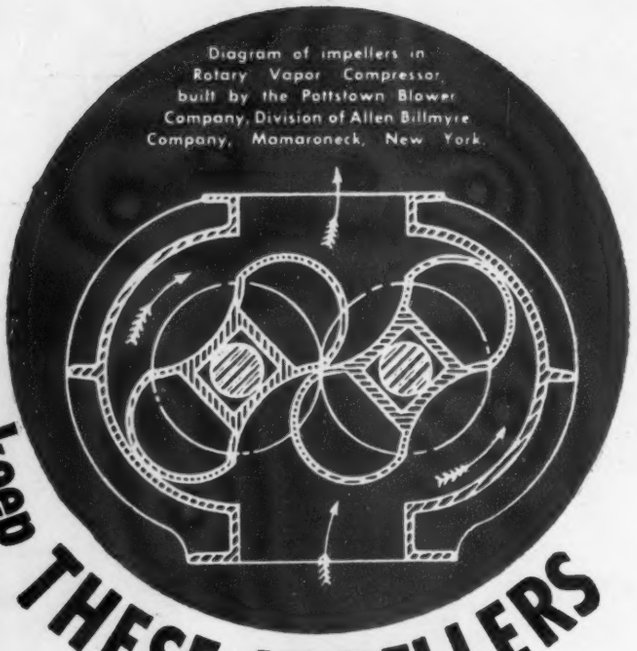


Diagram of impellers in Rotary Vapor Compressor, built by the Pottstown Blower Company, Division of Allen Billmyre Company, Mamaroneck, New York.

In units like this Rotary Positive Displacement Vapor Compressor, built by the Pottstown Blower Company, successful operation depends upon the correct interengagement of the impellers. Even a slight variation beyond permissible tolerances will have an effect on the efficiency of the unit.

Farrel-Sykes continuous tooth timing gears are used because of their extreme accuracy of tooth spacing and tooth thickness. This reduces backlash to a minimum, assuring correct timing and maximum effectiveness of the impellers.

Precision generated by the famous Farrel-Sykes process, these gears are widely known throughout industry for their smooth, quiet operation. Combined characteristics of overlap or interlacing of the teeth, gradual engagement and inclined line of pressure distribute the load on the teeth uniformly, reducing wear and maintaining correct tooth action over a long gear life.

The advantages of Farrel-Sykes continuous tooth herringbone gears are available to you, too. In our Buffalo plant, where we have specialized in gear design and manufacture for a quarter of a century, we are equipped to produce these gears in any size up to 20 feet in diameter for practically any industrial need.

Write for further details.

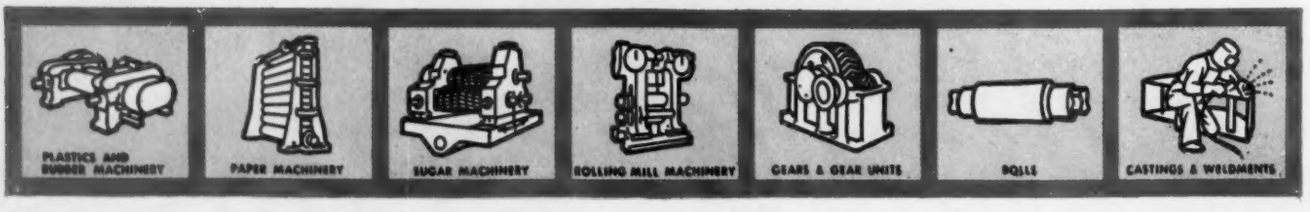
FB-243

FARREL
The Gear with a Backbone

Farrel-Birmingham

FARREL-BIRMINGHAM COMPANY, INC.
344 VULCAN ST., BUFFALO, N. Y.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston, Charlotte

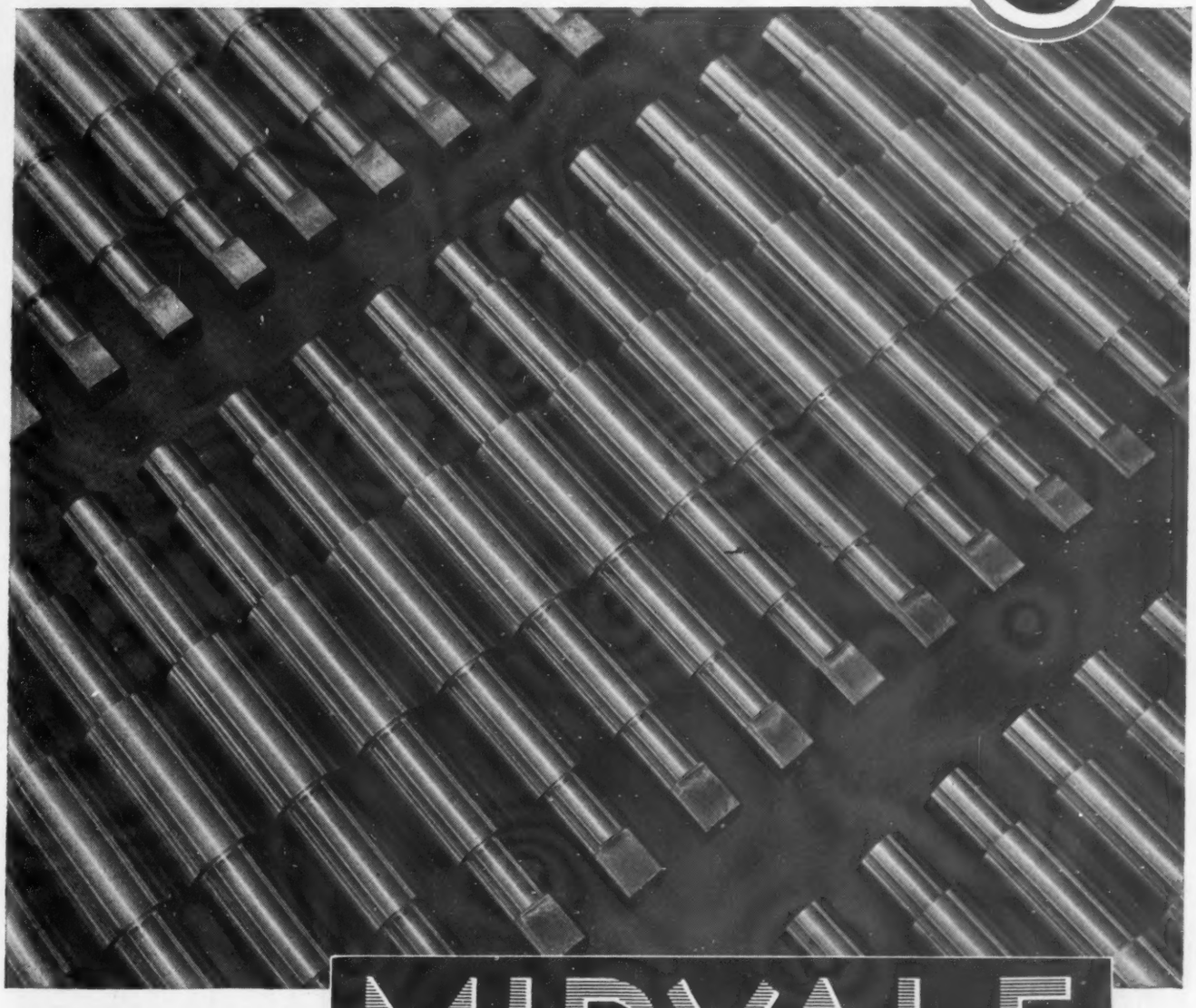


THE MEASURABLE DIFFERENCE

Hardened and ground steel rolls, when Midvale makes them, are so accurately processed that there is no discoverable difference between them. By any criterion — hardness, polish, dimensions — you'll find the measurements identical in every unit. Such standards of workmanship make these rolls, whether big or little, ideal for their purposes . . . rolling sheet and strip steels, precious metals, copper, aluminum, plastics and other synthetic materials. Their superiority becomes apparent under working conditions.

THE MIDVALE COMPANY • NICETOWN • PHILADELPHIA

OFFICES: NEW YORK • CHICAGO • PITTSBURGH
WASHINGTON • CLEVELAND • SAN FRANCISCO



One of eight plants to retain original Navy "E"

MIDVALE

Custom Steel Makers to Industry

FASTER Machining PLUS Freedom From TROUBLE

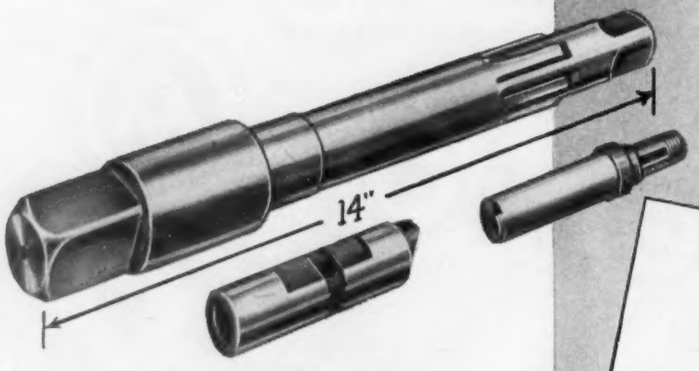
WITH X1515 AND X1545

SPEED CASE SPEED TREAT

OPEN HEARTH

STEELS

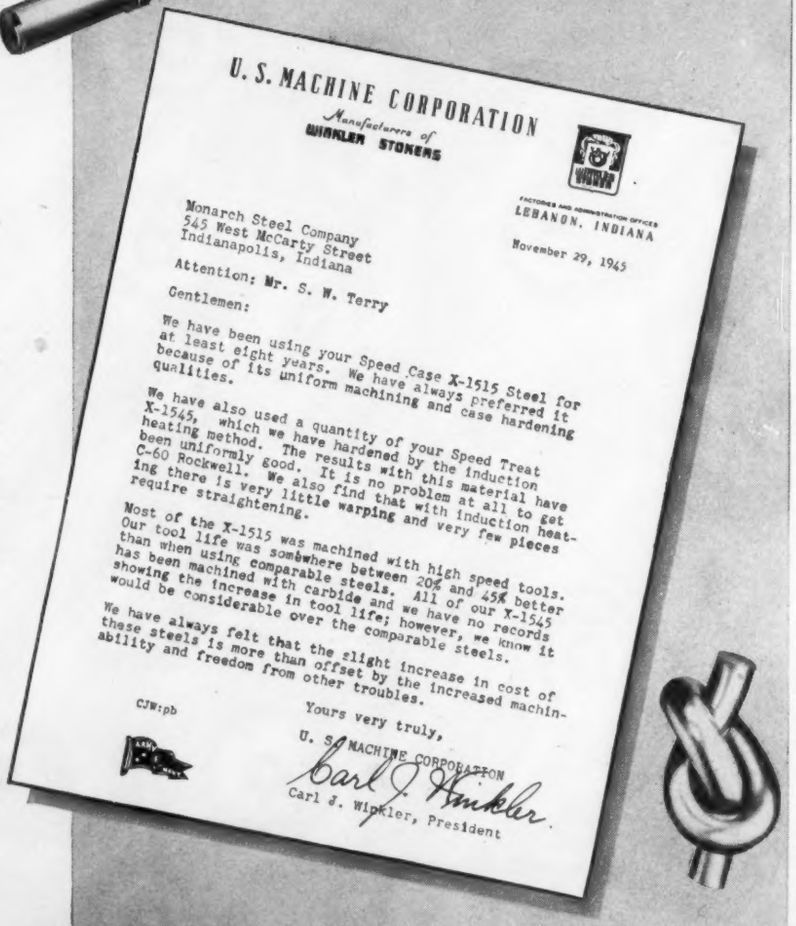
HAVE YOU BEEN MISSING A GOOD THING?



U. S. MACHINE CORP. SAYS:—

Used X1515 Speed Case Steel for 8 years because of uniform machining and case hardening. High Speed TOOL Life increased 20% to 40%.

SPEED TREAT X1545 induction hardened with uniform results, little warping and increased Tool life even when machined with carbide.



U. S. MACHINE CORPORATION
Manufacturers of
WINKLER STOKERS

FACTORIES AND ADMINISTRATION OFFICES
LEBANON, INDIANA

November 29, 1945

Monarch Steel Company
545 West McCarty Street
Indianapolis, Indiana

Attention: Mr. S. W. Terry

Gentlemen:

We have been using your Speed Case X-1515 Steel for at least eight years. We have always preferred it because of its uniform machining and case hardening qualities.

We have also used a quantity of your Speed Treat X-1545, which we have hardened by the induction heating method. The results with this material have been uniformly good. It is no problem at all to get C-60 Rockwell. We also find that with induction hardening there is very little warping and very few pieces require straightening.

Most of the X-1515 was machined with high speed tools. Our tool life was somewhere between 20% and 45% better than when using comparable steels. All of our X-1545 has been machined with carbide and we have no records showing the increase in tool life; however, we know it would be considerable over the comparable steels.

We have always felt that the slight increase in cost of these steels is more than offset by the increased machinability and freedom from other troubles.

CJW:pb

Yours very truly,

U. S. MACHINE CORPORATION

Carl J. Winkler

Carl J. Winkler, President

----------TEAR THIS OFF----------

Licensor
MONARCH STEEL COMPANY
HAMMOND · INDIANAPOLIS · CHICAGO
PECKOVER'S LTD., Toronto, Canadian Distributor

MANUFACTURERS OF COLD FINISHED CARBON AND ALLOY STEEL BARS

Licensee for Eastern States
THE FITZSIMONS COMPANY
YOUNGSTOWN, OHIO

PASTE ON YOUR LETTERHEAD AND

MAIL IT IN

FOR

SPEED CASE—SPEED TREAT

CATALOG

A SNYDER "*Special*" FOR A SPECIAL JOB

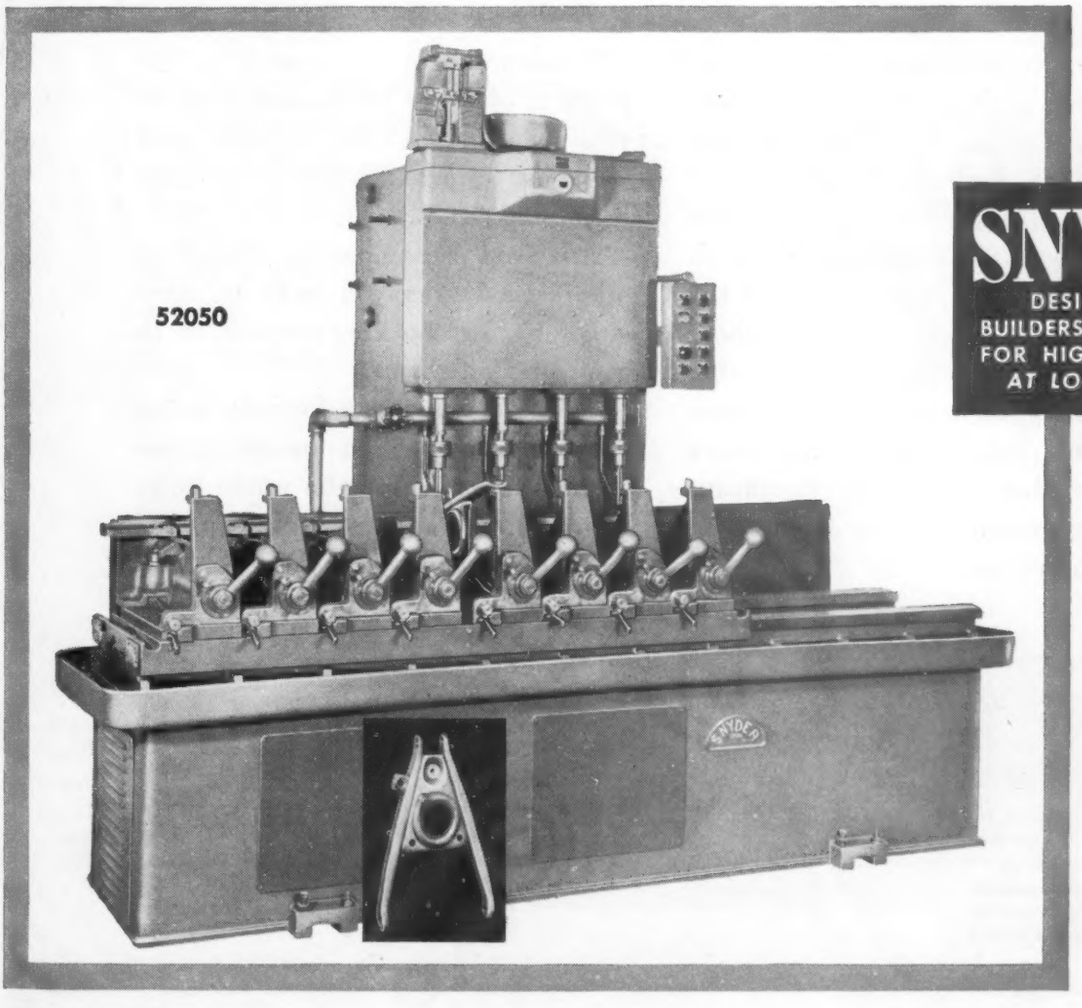
This Snyder four-spindle tapping machine for tapping automotive front wheel support brackets is another example of Snyder's skill in creating special purpose machines that will do the job quickly and accurately, with minimum of operator fatigue and maximum convenience and safety.

The machine has a welded steel column containing the tapping spindle drive motor, leadscrew mechanism and the necessary depth control limit switches.

The fixture table is equipped with eight fixtures, thereby making it possible to work on four parts while four finished parts are unloaded and the fixtures reloaded. The fixtures and the table move hydraulically from the loading to the working positions.

The base of the machine contains the hydraulic equipment for moving the table and fixtures back and forth. The lubricant for the taps is contained in the lower portion of the column.

Into every Snyder machine is built the fruits of twenty-one years experience in developing special-purpose machines for specific metal-cutting problems. Possibly there is a place in your production line for a machine that will accomplish definite economies in time, effort, tools and materials. We invite your inquiries. *Snyder Tool & Engineering Company, 3400 E. Lafayette Detroit 7, Michigan.*

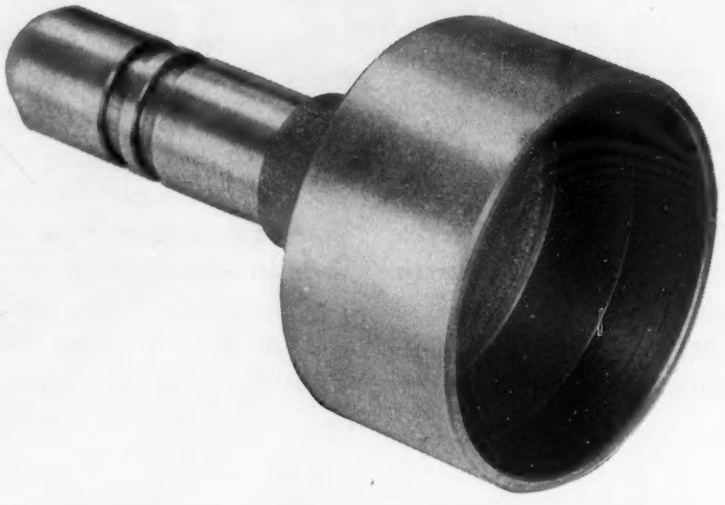


SNYDER

DESIGNERS AND BUILDERS OF MACHINERY FOR HIGH PRODUCTION AT LOW UNIT COST

21 Years of Successful Cooperation with Leading American Industries

You can sell **MORE** *if you produce for* **LESS**



Here is a typical example of modern production methods on a modern machine—a distributor housing requiring 42 separate operations. The job was finished on an Acme-Gridley Automatic Chucker with one change of set up on the same machine, in only 20% of the time required by best previous method.

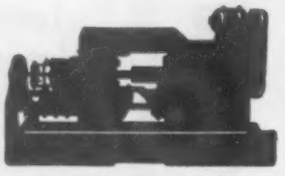
Naturally such a percentage saving cannot be guaranteed for every automatic job, but we can point out a large number of equally significant post-war examples now running in many industries.

Perhaps the best approach to the problem of lower production costs in your plant is to let our engineers give you cost estimates, based on their broad experience.

Just send us samples or blueprints of precision jobs you have to do—either bar or chucking—or ask us to come and get them.

That's a quick way for you to determine how good an investment an Acme-Gridley Automatic would be in your plant.

We'll be glad to hear from you.



ACME-GRIDLEY
BAR and CHUCKING AUTOMATICS
Maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

THE NATIONAL ACME COMPANY

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N·B·M SILVER BABBITT FOR HEAVY PRESSURE

By alloying silver with lead, we produced a babbitt metal that remains stable under high speeds and heavy loads. During many years of gruelling wartime service it has proved its qualities:

- High Anti-frictional Qualities
- Ease of Bonding
- Retention of Hardness at High Temperatures
- Resistance to Squeezing Out
- Embedability
- Ease of Handling
- Resistance to Corrosion

Give N-B-M Silver Babbitt your toughest test. It will stand up to it.

NBM

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DIVISION

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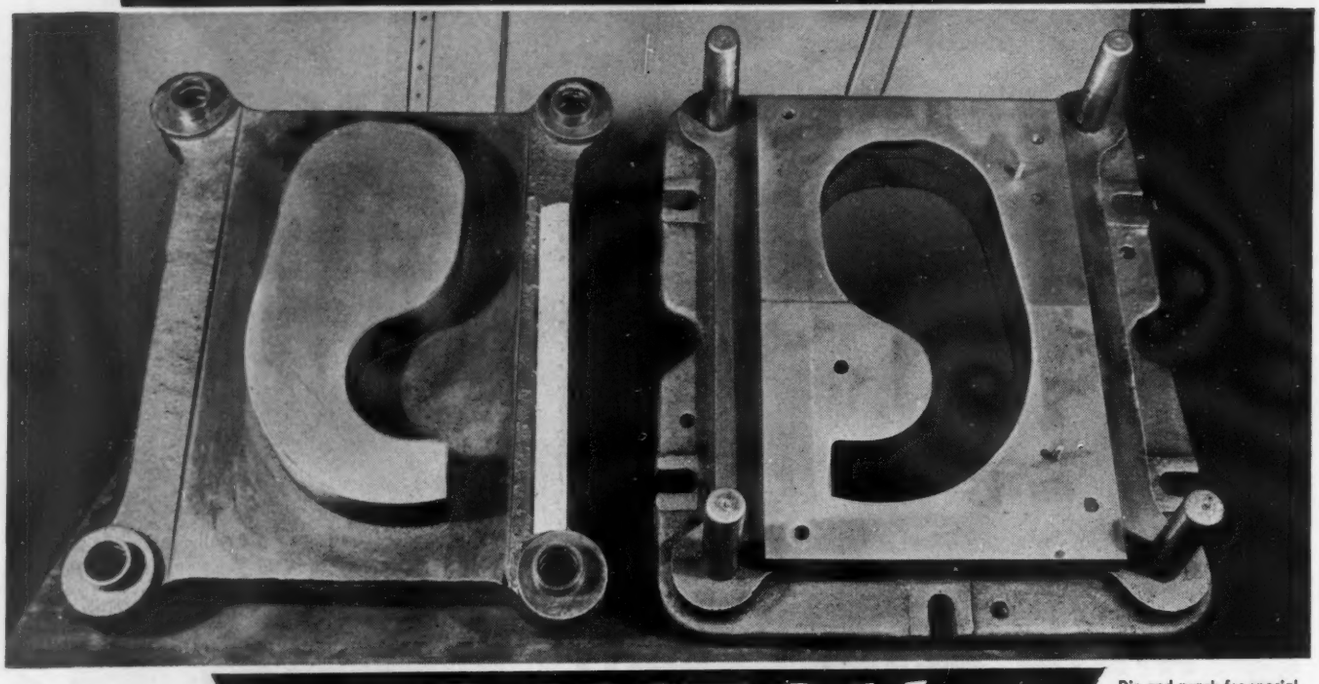
FOR INTRICATE TOOLS AND CROSS SECTIONS THAT REQUIRE DEEP HARDENING



Die and punch for special cutting tool. Made from Mansil Die Steel.

DISSTON
MANSIL DIE STEEL

This is one of the most dependable tool steels ever made, and it can be relied upon fully in forging, machining, grinding and heat treatment. Because of minimum distortion and excellent machinability, Mansil Die Steel is specially recommended for complicated dies and punches, particularly where cross sections must be deeply hardened.

Mansil Die Steel can be annealed very soft with the carbides spheroidized for machinability. Upon correct heat treatment this structure changes to a fine martensite. The fracture grain, too, will be fine, ranging from 9 to 10 Shepard.

When properly hardened and drawn, Mansil Die Steel has a tensile strength in excess of 350,000 lbs. per sq. in. At a working hardness of Rockwell C-60 to 61, the elastic limit will be over 300,000 lbs. per sq. in.

Use Mansil Die Steel for cutting, blanking and forming dies and numerous other applications where an exceptionally high quality tool steel is required.

ANALYSIS

Carbon . . .	.90%
Manganese .	1.15%
Chromium . .	.50%
Tungsten . .	.50%

ESTABLISHED 1840 TRADE MARK REG. U.S. PAT. OFF.

LET DISSTON ENGINEERS HELP SOLVE YOUR TOOL STEEL PROBLEMS

Disston engineers and metallurgists will be glad to help you with any tool steel problem that may confront you. Write in confidence, giving full particulars.

HENRY DISSTON & SONS, INC., 226 Tacony, Philadelphia 35, Pa., U. S. A.

Designed exclusively for table rollers, these sturdy, two-piece pillow blocks permit the *most* load carrying capacity in the *least* space. They're readily adaptable for use with a central lubricating system, they may be cast in iron or steel, and they're equipped with the exclusive SKF Triple Seal that keeps lubricant *in* . . . dust, scale and water *out*. Let our engineers show you how SKF Pillow Blocks can reduce operating costs by protecting the bearings on *your* table rollers.

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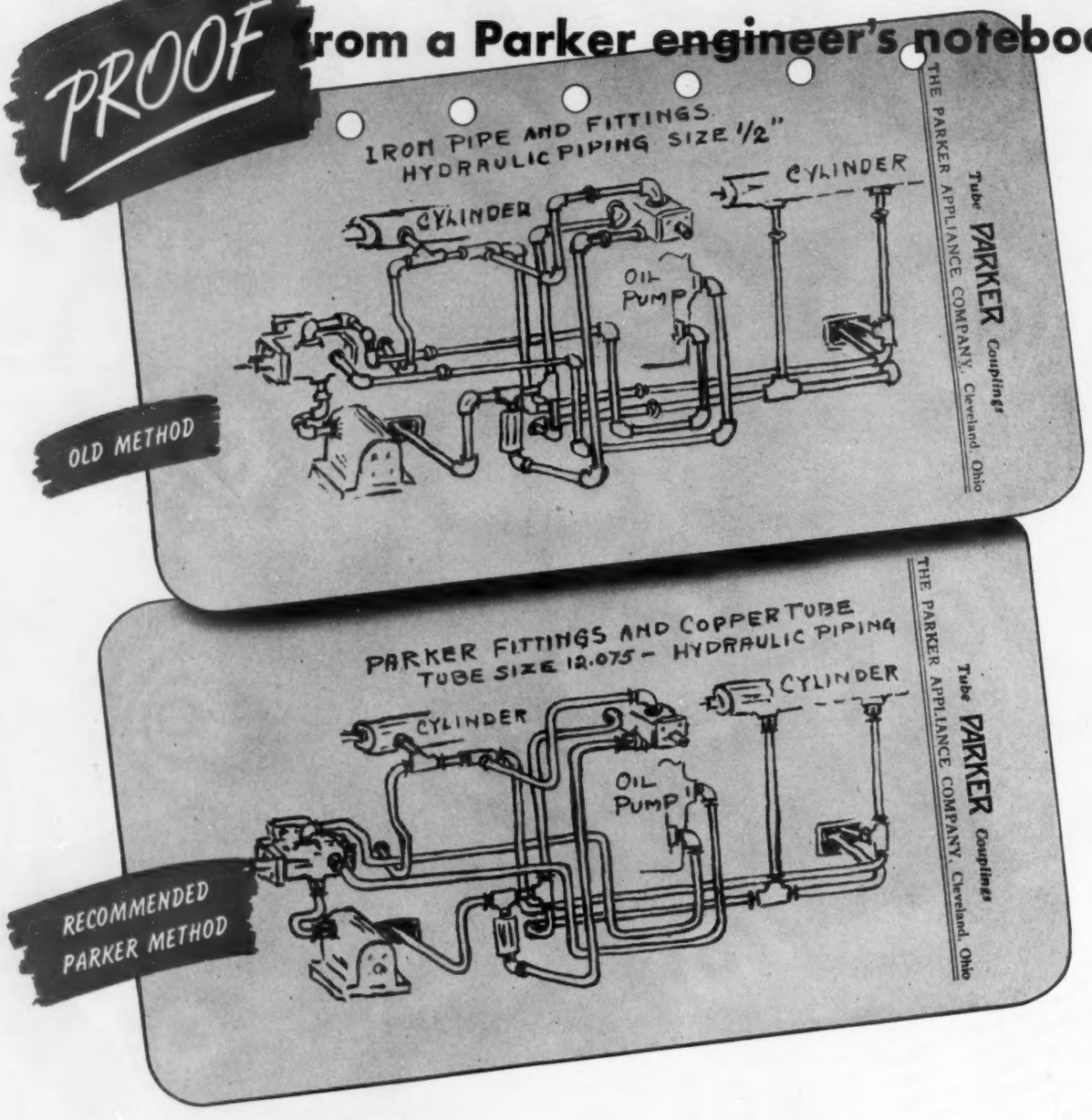
SKF INDUSTRIES, INC.
Front Street & Erie Ave., PHILA. 34, PA.

SKF
BALL AND ROLLER
BEARINGS

PROOF from a Parker engineer's notebook



Advantages of Parker Recommendation

- Streamlined flow, free from obstructions. No sharp turns and pockets to cause turbulence. Less pressure drop; capacity and pressure requirements reduced.
- Fewer joints and connections—to reduce leakage, even under high pressure, vibration, shock, fluid hammer, surge or accidental abuse.
- Compact, spacesaving, neat and simplified installation, especially in tight places—yet all parts are accessible for quick, easy installation and service.

We've engineered Fluid Power installations for many people—to bring them these advantages, under a wide range of exacting conditions. May we do the same for you? Let's talk it over.

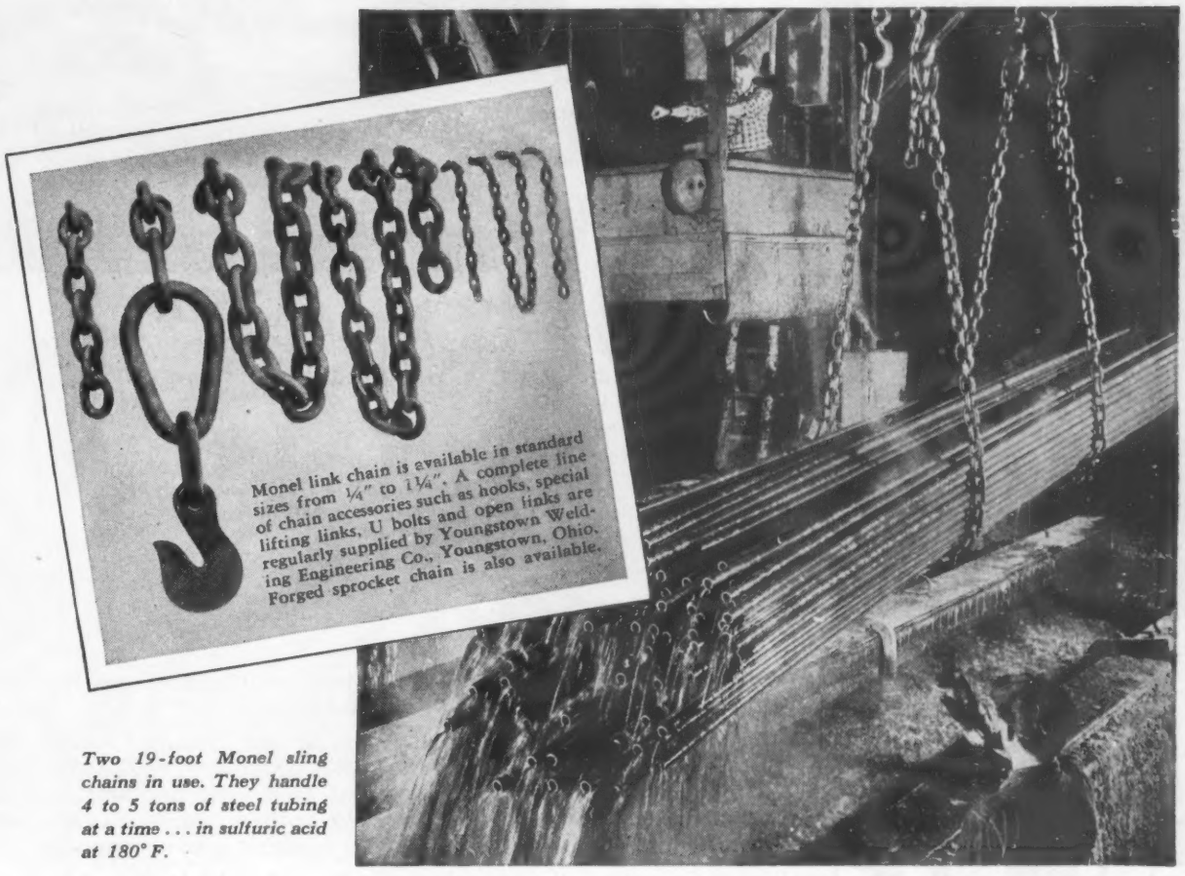
THE PARKER APPLIANCE CO.

CLEVELAND • LOS ANGELES

FLUID POWER PRODUCTS FOR ALL INDUSTRY

"For our **HEAVIEST** loads we use LIGHTWEIGHT chain!"

... says steel mill pickling superintendent


Monel link chain is available in standard sizes from ¼" to 1¼". A complete line of chain accessories such as hooks, special lifting links, U bolts and open links are regularly supplied by Youngstown Welding Engineering Co., Youngstown, Ohio. Forged sprocket chain is also available.

Two 19-foot Monel sling chains in use. They handle 4 to 5 tons of steel tubing at a time ... in sulfuric acid at 180° F.

Which would you consider safer ... ¾" chain that had already seen 6 years' service ... or 1¼" chain only 9 months old?

The newer, heavier chain, you say? Read what this user reports:

> *"... the 1¼" cast acid-resisting chain began to need repairs after nine months of service. So—in spite of the great difference in size—whenever we have particularly severe loads, we use the ¾" Monel chain. Although it is over six years old, we find it reliable and not subject to sudden breaks, as is the case with the cast acid-resisting chain."*

Monel* pickling chain is made from hot-rolled Monel rod, formed in specially designed dies. The links are welded. Made in this way it is much stronger and tougher than the cast acid-resisting type.

Even *more* important, Monel chain resists corrosion by pickling acids ... it *retains* its strength and thus provides years of trouble-free, economical service. The same is true of crates, baskets, tie-rods and other Monel pickling equipment.

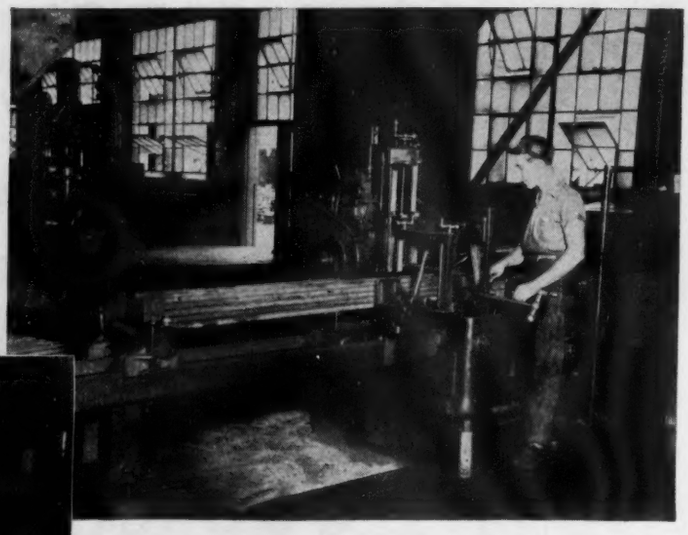
Practical, usable information which can help you increase pickling room efficiency is contained in the booklet, "Safety and Service with Monel Chain." Write for *your* copy *now* ... before it slips your mind.

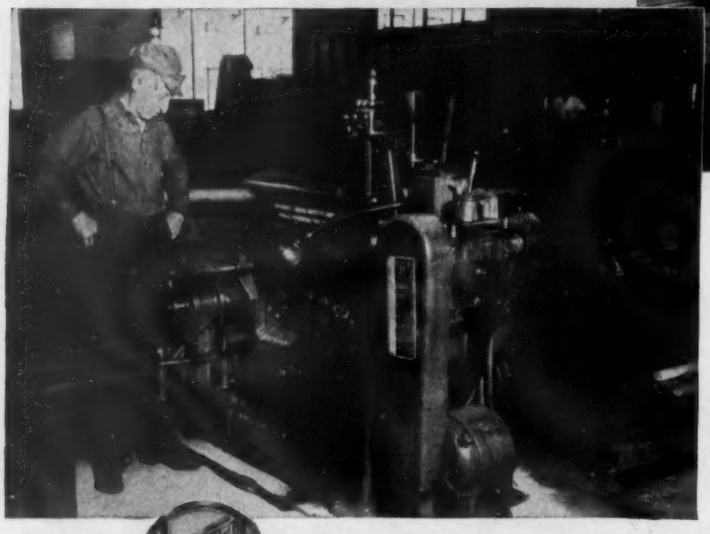
The International Nickel Company, Inc., 67 Wall Street, New York 5, N. Y.

*Reg. U.S. Pat. Off.

Monel

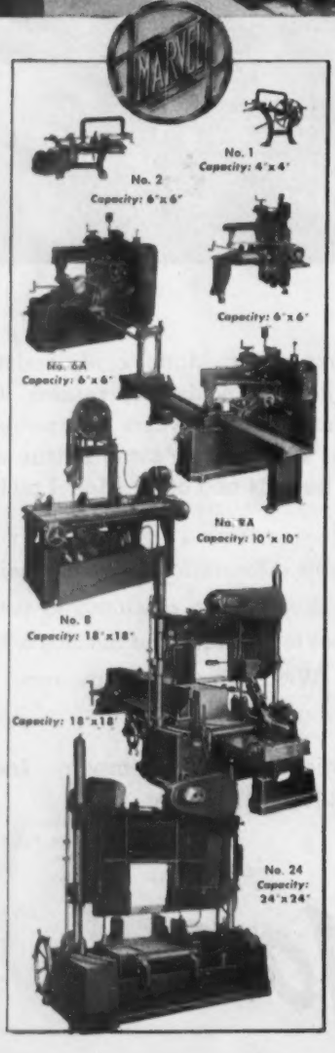
RAILWAYS ARE *Streamlining* THEIR SHOPS TOO!





(ABOVE) *MARVEL No. 9A Production Saw automatically cutting-off hollow iron into staybolts; 1" x 9", 30 bolts to the cut.*

(LEFT) *Cutting accurate lengths from 3½" steel tubing for spring and brake hanger bushings.*



Railway shops are "re-converting", not to new products but to newer and more efficient methods.

Today, in the Paducah shops of the Illinois Central, for example, much cutting-off work is being done with MARVEL No. 9A Production Saws that feed, measure and cut off identical lengths automatically with no more operator attention than is required by an automatic screw machine.

Operating "automatically", the MARVEL No. 9A Saw illustrated above, has cut-off as many as 300 pieces of 1" round staybolt stock in a single hour. Supervision at the Paducah shops tell us that the machine paid for itself in the first 30 days and has been piling up dividends ever since. These extremely accurate and fast saws are not limited to production cutting-off work, because at any point in a "run", the automatic bar push-up can be dis-engaged, a miscellaneous cut made, and the production run resumed by merely re-engaging the bar push-up clutch.

The MARVEL System of Metal Sawing comprises 9 different types of metal-cutting saws; provides the complete answer to most metal sawing problems.

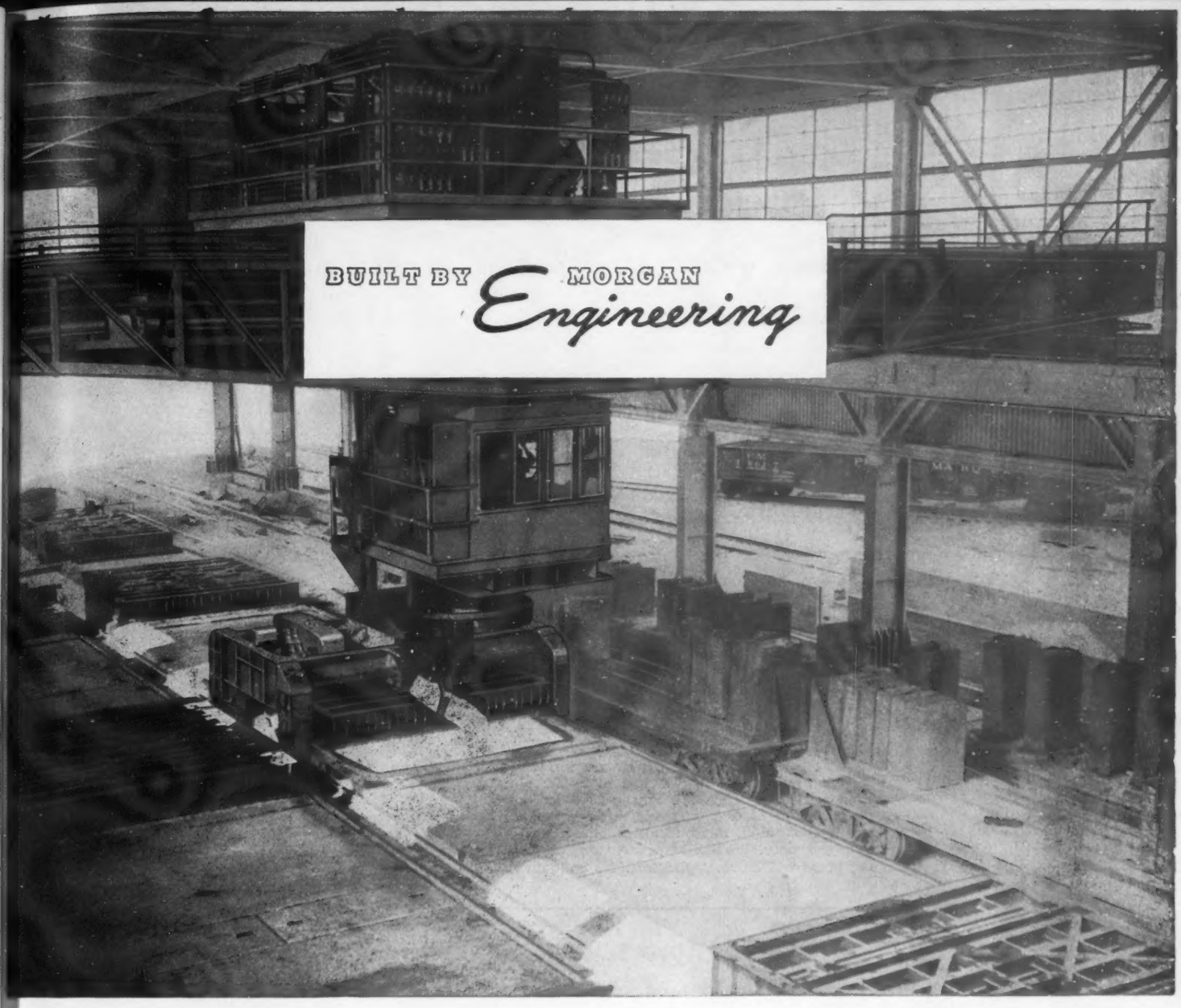
ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave. **Chicago 39, U. S. A.**

Eastern Sales Office: 225 Lafayette St., New York 12, N. Y.

MARVEL SAWS



MORGAN 10-TON SOAKING PIT CRANE

HANDLING SLAB INGOTS IN A WEST COAST STEEL PLANT

Illustrated is a Morgan 10-Ton, 7-Motor, 81′ 0″ Span Soaking Pit Crane with 15-Ton Auxiliary Hoist. Morgan superiority of design and construction is built into every part to insure many years of profitable service. It is equipped with fabricated welded trolley and bridge trucks and anti-friction bearings throughout. Trolley is of the worm operated type which simplifies the construction and lowers the cost of maintenance.

THE MORGAN ENGINEERING CO.

ALLIANCE, OHIO. 1420 Oliver Building, Pittsburgh

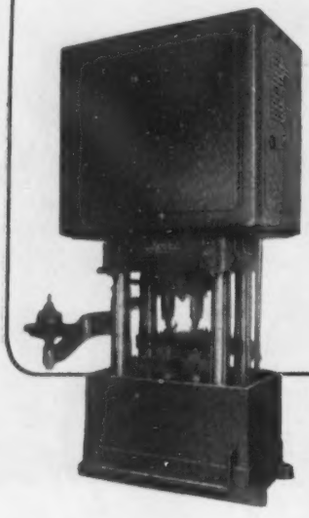
DESIGNERS • MANUFACTURERS • CONTRACTORS • BLOOMING MILLS • PLATE MILLS • STRUCTURAL MILLS • ELECTRIC TRAVELING CRANES • CHARGING MACHINES • INGOT STRIPPING MACHINES • SOAKING PIT CRANES • ELECTRIC WELDED FABRICATION • LADLE CRANES • STEAM HAMMERS • STEAM HYDRAULIC FORGING PRESSES • SPECIAL MACHINERY FOR STEEL MILLS

Hanna Riveters

backed by 40 years experience
over 700 styles and sizes

There's an efficient Hanna Riveter for every purpose, whether the rivets are squeezed hot or cold. Hanna makes portable and stationary riveters, both hydraulic and pneumatic, for squeezing rivets from ⅛" to 2" diameter with reach ranging from 2" to as large as 21'—0".

With Hanna Riveters, every rivet is set tight, and every rivet receives the same tonnage. Long and varied experience in building and designing riveters for every application is your assurance that Hanna can furnish the riveter best suited to your job . . . and that will enable you to obtain the operating efficiency needed to give you more rivets per man per day. Write, tell us what you're riveting. We'll recommend the proper equipment to use.



WANT PRODUCTION RIVETING?

have a Hanna Riveting Press built to do your job best!

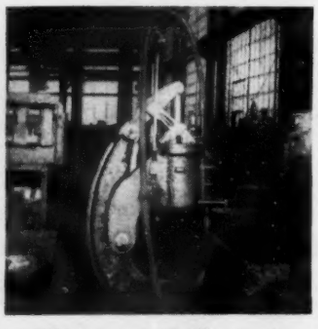
• Where speed and smooth dependable work are essential, it doesn't pay to adapt the job to fit the riveter. Many busy plants are using riveting presses designed by Hanna for their specific application. At the left is a 200 ton Hanna Hydraulic Riveting Press tooled for duplex riveting of a gear assembly. Send us a sample assembly, if practical, or blueprints of your assembly. We'll tell you what kind of riveting press will be most practical. No obligation.

Hanna RAPID SQUEEZE Riveters

• For production work, this Hanna Rapid Squeeze Riveter is a natural. It sets rivets cold with one stroke and each rivet receives the same tonnage. The simple, but powerful mechanism, result of Hanna's 40 years' experience, assures trouble-free operation. Available in models for driving $\frac{3}{16}$", ¼", $\frac{5}{16}$" and ⅜" rivets cold.

Hanna
SHEPHARD PINCH BUG RIVETER

• The fastest structural riveter you can have in your shop. Over 7000 rivets driven in nine hours—and every one set tight is an everyday occurrence with these speedy riveters. This rapid riveting is possible because a Hanna Shephard drives rivets from below. It has a 20" reach for greater flexibility and handles up to 1" diameter rivets. For real production on structural steel riveting, get a Hanna Shephard Pinch Bug.



. . . write for Hanna Riveter Catalog

HANNA ENGINEERING WORKS
1765 ELSTON AVENUE • CHICAGO 22, ILLINOIS

Air and Hydraulic RIVETERS
VALVES

Air and Hydraulic CYLINDERS
AIR HOISTS

Call in SOCONY-VACUUM for this Correct Lubrication Program

- Lubrication Study of Your Entire Plant
- Recommendations to Improve Lubrication
- Lubrication Schedules and Controls
- Skilled Engineering Counsel
- Progress Reports of Benefits Obtained

GARGOYLE Lubricants

NO, this isn't an engineer's nightmare! It's our conception of the different types of gears in your plant, linked in a continuous train. Production costs . . . and profits . . . depend on efficient operation of gears like these. Each gear has its own lubrication needs.

Some are ordinary open gears. Socony-Vacuum makes a special "Black Magic" fluid to prolong their life. There's a worm gear. Socony-Vacuum has special oils that stay on despite the wiping, sliding action. There are herringbone gears, hypoids, bevels and spiral-bevels. Socony-Vacuum engineers have the products . . . and the knowledge . . . to assure scientific lubrication for every type under every condition.

The same applies to all bearings and cylinders. Socony-Vacuum's great new wartime developments, backed by 80 years' lubrication experience, are available in a Complete Lubrication Program for your plant. Insure maximum machine efficiency now with this program.

Socony-Vacuum Oil Co., Inc.

and Affiliates: Magnolia Petroleum Company, General Petroleum Corp. of Calif.

Tune In "Information Please"—Monday Evenings, 9:30 E.S.T.—NBC

then he said to himself:

"Beat their brains IN . . . not out"

AGED Japanese Diet member, YUKIO OZAKI, lifelong champion of parliamentary government, recently called upon his colleagues to resign rather than persist in blind obedience to government. Said he:

> "Our people of today do not know right from wrong. We must pour into their heads the law of humanity and the difference between right and wrong."

The difference between the right way of doing things and the wrong way would seem an easy thing to knock into heads,

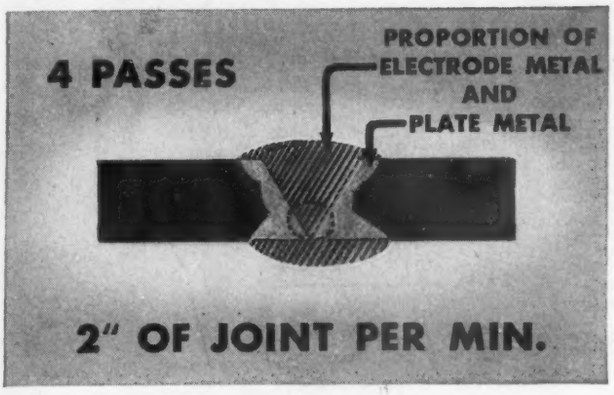
—but even here in America it sometimes takes **KNOCKS** like that of the **SHERIFF** to awaken interest;

—while with others the gentle **KNOCK** of **OPPORTUNITY** spurs them to deeds for the good of all.

"The difference between RIGHT and WRONG"...*he says*

LOOK, OZAKI... Here is the difference between RIGHT and WRONG in making a down-hand butt weld in ⅜" plate:

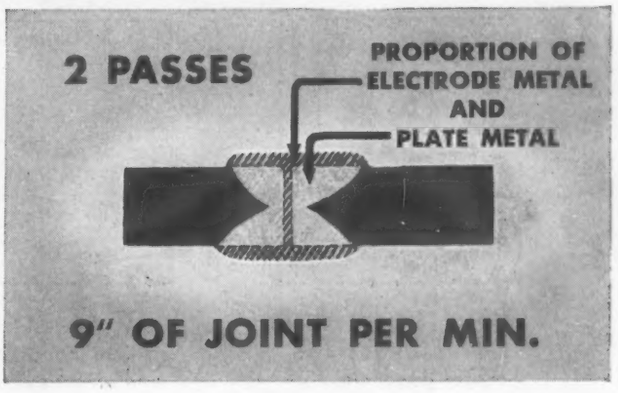
WRONG



CONVENTIONAL TECHNIQUE . . .

⅜" plate. 60° bevel. 1/16" gap. 1st pass (sealing bead): 3/16" "Fleetweld 5", 150 amps. 2nd, 3rd, 4th passes: ¼" "Fleetweld 5", 250 amps.

RIGHT



"FLEET-WELDING" TECHNIQUE . . .

⅜" plate. No plate beveling. 1st, 2nd passes: 5/16" "Fleetweld 5", 450 amps. Increases welding speed 350%. Cuts deposited metal 50%.

DIFFERENCE: 75¢ on the dollar

The "Fleet-Welding" technique uses "arc force" to reduce the amount of deposited metal and increase the rate of deposit. Also, in some cases, such as the butt weld shown, it eliminates plate beveling. Results for this joint: strength equals that of conventional weld; deposited metal is cut 50%; welding speed is increased 350%; cost is cut 75%.

For all types of joints, in all positions: "Fleet-Welding" procedures for all applications in mild steel plate and sheet are given in handy pocket manual, Bul. 444. Free on request. Ask for it on your business letterhead.

THE LINCOLN ELECTRIC COMPANY
Dept. L-1 Cleveland 1, Ohio

The RIGHT Ways to Control Distortion

The new Lincoln sound-color movie, "The Prevention and Control of Distortion in Arc Welding", by Walt Disney Productions, explains simply and clearly the causes and cures of distortion. A valuable aid to designers and production men. Available free for showing to groups. Ask for Bul. 709.

America's greatest natural **recourse**

ARC WELDING

How many studs can you install in 10 minutes?

THE OLD WAY

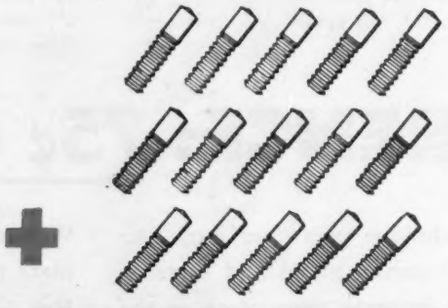
DRILL HOLES
(after layout and center punching)

TAP THREADS
(a slow hand operation on jobs like this)

INSTALL STUDS
(a third hand operation in this slow, costly method)

= 1

THE NELSON WAY



= 15

100 TO 200 STUD WELDS PER HOUR can be made manually. NELSON flux-filled studs are available from 1/8" to 3/4" in diameter, and up to 8" in length in both standard and a wide variety of special types.

NELSON manual welders are as portable as an electric drill; precision NELSON production-model welders are available with capacities of 20 or more studs per minute.

GET THE FACTS—write or wire for complete information NOW!

NELSON SALES CORP.
LORAIN, OHIO

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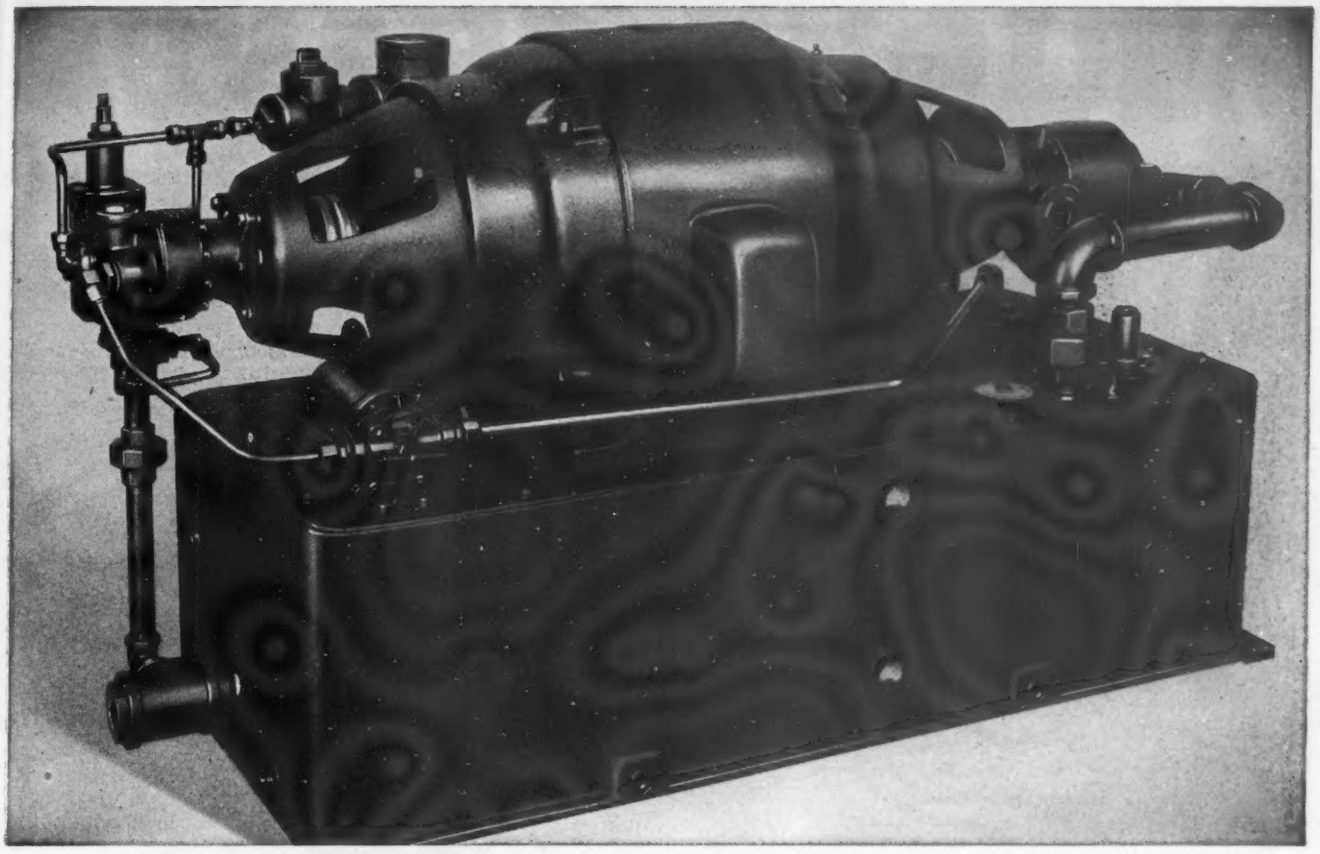
San Leandro, California

OTHER NELSON FLUX-FILLED STUDS



HYDRAULIC POWER UNITS • 3000 P.S.I.

Packaged Assemblies Combining High Pressure Low Volume and Low Pressure High Volume Pumps and Valves for Manual and Automatic Control

PRESSES • CALENDER ROLLS • HYDROSTATIC TESTS • ROLL BALANCING
BROACHES • PRESSURE SEALS • FLOW TESTS • BEARING FLOTATION

Hy-Lo Hydraulic Unit

21 GPM • 3000 P.S.I.

These units have been in extended service in Rolling Mills • Textile Plants • Chemical Plants • Plastic Plants • Testing Laboratories • Research Laboratories • Rubber Plants • Powdered Metal Industry • Aviation Research • Airplane Manufacture for Standard Equipment and Production Test Procedure

3000 P.S.I. Pumps in Capacities of ½- 1- 2- 3 GPM • Hy-Lo Combinations 5 GPM and Up

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Experienced Hydraulic Engineers Are Available Without Obligation

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THE NEW YORK AIR BRAKE COMPANY

Hydraulic Division

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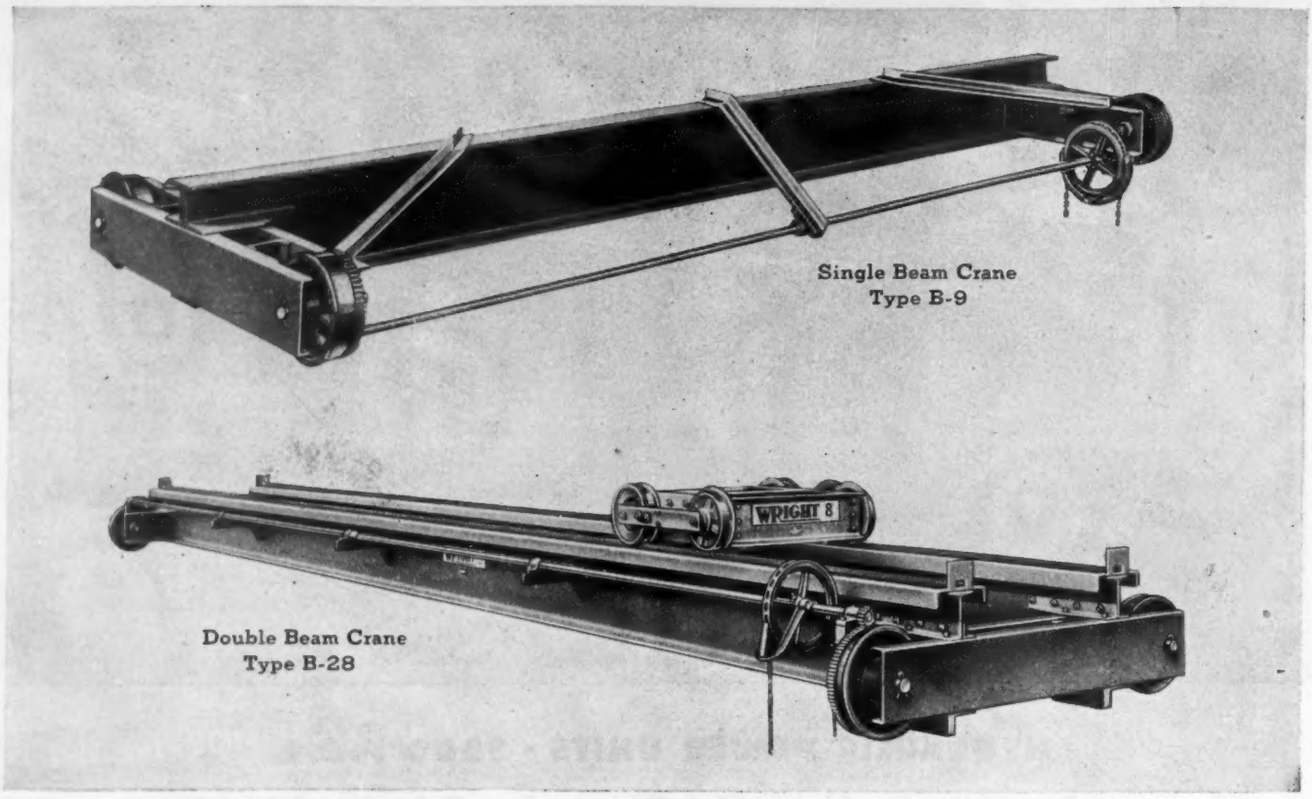
WRIGHT CRANES



Single Beam Crane
Type B-9

Double Beam Crane
Type B-28

Competition is going to be plenty tough all this year and next. Never before in all history have manufacturers stood in such need for labor-saving — labor-aiding equipment, and production efficiency. Not only do you need a Wright traveling crane which will really put your ceiling to work, but you need Wright's material-handling experience to help you cut costs and assist you in speeding up production.

Wright material-handling equipment (cranes, hoists, and trolleys) is built in a wide range of capacities and to meet the most exacting specifications. The Wright combination of crane and hoist is engineered not only to help bring your production costs down to competitive levels but for reduced maintenance expense. Call your local Wright distributor (see metropolitan classified telephone directory). If your problem is special he will bring along a Wright engineer. In the meantime, write for Wright Specification Bulletin, or Catalog 12-D.

ACCO

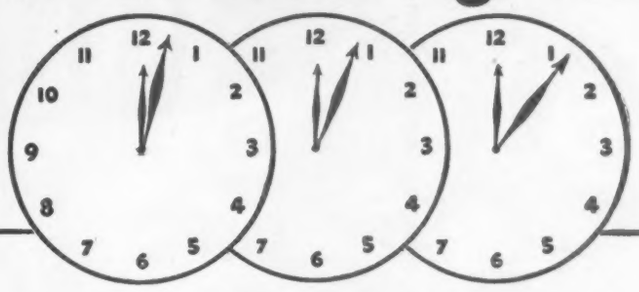
York, Pa., Chicago, Denver, Los Angeles, San Francisco, Portland, New York, Bridgeport, Conn.

WRIGHT MANUFACTURING DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

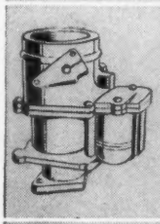
In Business for Your Safety

How to Cut Metal Cleaning Time to MINUTES

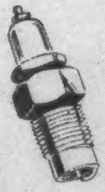


NEW, FAST-ACTION DETERGENT CLEANS FERROUS AND NON-FERROUS METALS...Easy to Handle

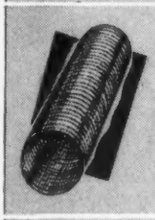
TYPICAL USES FOR Solvent "26"



CARBURETORS—Solvent "26" removes gum, gasolene sediment and other accumulations of dirt.



SPARK PLUGS—Solvent "26" safely cleans porcelain; helps loosen carbon deposits.



METAL PLATES AND SCREENS—Solvent "26" restores clear, clean finish to any metal surface.

DIES AND STAMPING—Solvent "26" removes drawing compounds from die-formed or stamped metal.

LABORATORY EQUIPMENT—Solvent "26" frees glass and metal tubing and their supports of gums, varnishes and other incrustations or deposits.

PISTONS—Removes lacquers, gums, resins, etc. from gas, gasolene and diesel engine pistons and rings. Also effective for cleaning all parts of dismantled motors, engines and machinery.

REMOVES:

Oil • Grease • Gums • Varnishes • Lacquers • Paints
Carbonaceous Deposits • Asphaltic Products

FROM:

Steel • Cast Iron • Aluminum • Porcelain • China
Chrome and Nickel Plate • Stone • Precious Metals
Brass • Washable Fabrics

Used throughout the war in critical industry as a superior cleaning agent, newly-developed SOLVENT "26" is now available for all industrial needs.

Offering many advantages in time, labor and cost over other present cleaning methods . . . Solvent "26" is so effective a detergent it can be used at *ordinary* room temperatures.

The fast action of Solvent "26" reduces cleaning time from hours to minutes on dismantled engine parts and all kinds of machinery. Simply dip, rub, brush or spray it on. Then flush clean with hot water.

Mail the coupon today for literature and information leading to a demonstration of this unique product in your own plant.

CITIES SERVICE OIL COMPANY
ARKANSAS FUEL OIL COMPANY

CITIES SERVICE OILS
ONCE-ALWAYS

Cities Service Oil Company
Room 648
70 Pine Street
New York 5, N. Y.

Gentlemen: I am interested in a demonstration of Solvent "25"—at no cost or obligation.

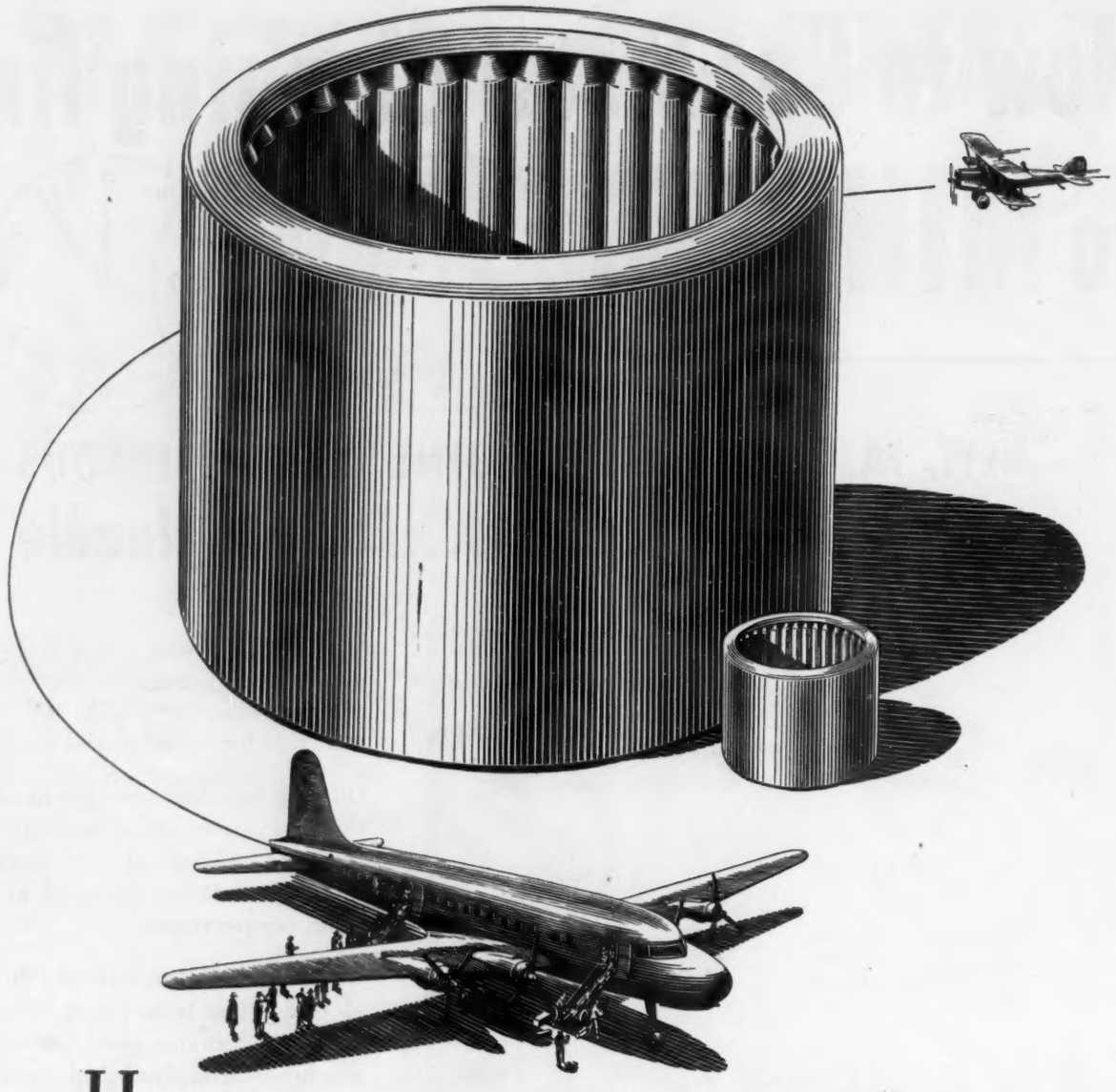
Name.....

Title.....

Company.....

Address.....

City.....State.....



Here's One Way to Pack More Payload* into Your Product...

Weight-reduction is important in many fields other than aircraft . . . in fact, it's the order of the day in design of machines, tools, appliances and handling equipment.

That's why the weight-saving, space-conserving features of anti-friction Torrington Needle Bearings are so important. For the full complement of small diameter needle rollers gives a tremendous radial load capacity in an extremely small and compact unit. Furthermore, the bearing is designed for mounting in the simplest type of housing—a bore machined to proper dimensions . . . and installation is a simple press-fit operation.

These features, contributing directly to weight-and-space-saving designs, are enabling many manufacturers to increase the payload* of their products by improving the "*operating efficiency-weight ratio.*"

Let us give you the full story of Needle Bearing advantages in terms of your own design requirements. Considerable engineering and application data are available in the Torrington Needle Bearing Catalog No. 32, furnished upon request. Our engineering department will be glad to work with you on any specific design or application problem.

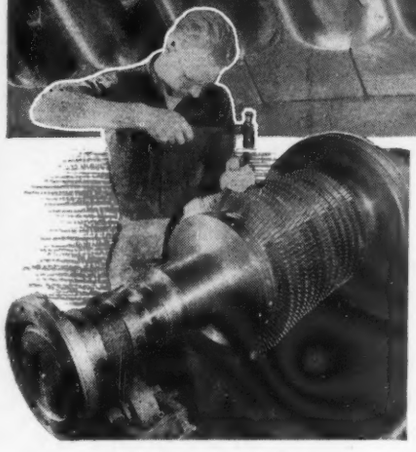
THE TORRINGTON COMPANY

TORRINGTON, CONN. SOUTH BEND 21, IND.

Offices in All Principal Cities

TORRINGTON NEEDLE BEARINGS

STEEL HARNESS *for* SUPERHEATED STEAM



Above: Close-up view showing individual reaction blades before installation of shrouding. At the left: Blades being inserted in rows in a high pressure marine steam turbine spindle.

Steam is a powerful "work horse," but it must be harnessed to make it work. And here, in the marine steam turbine, is one such form of harness.

Small reaction blades like those above, mounted in rows on the turbine spindle, take thousands of horsepower from superheated steam and apply it to marine propulsion.

But it takes sturdy material to stand up under a continuous blast of superheated steam at 950° F. and 1200 pounds pressure. That's why steam turbine blades and shrouding are made of Republic Electric Furnace Steel in stainless grade.

These top-notch steels are exceptionally strong and tough, even at elevated temperatures. They resist erosive and abrasive wear. They resist corrosion and pitting. And they are "targeted" by electric furnace melting to hit narrowest physical, chemical, hardenability and performance specifications repeatedly.

Moreover, their consistent uniformity enables manufacturers to get best results from mass production methods. They are as CLEAN and SOUND, as free from practice-upsetting variables, as steel can be made. They insure against hidden imperfections which could result in rejection at final inspection or failure in service.

YOUR products may be far removed from steam turbines—but they have much in common, particularly *quality, salability* and *cost.* That's why electric furnace steels may be just what you need. And Republic, world's leader in this field of steel-making, is ready NOW to help you use them to best advantage. Write to—

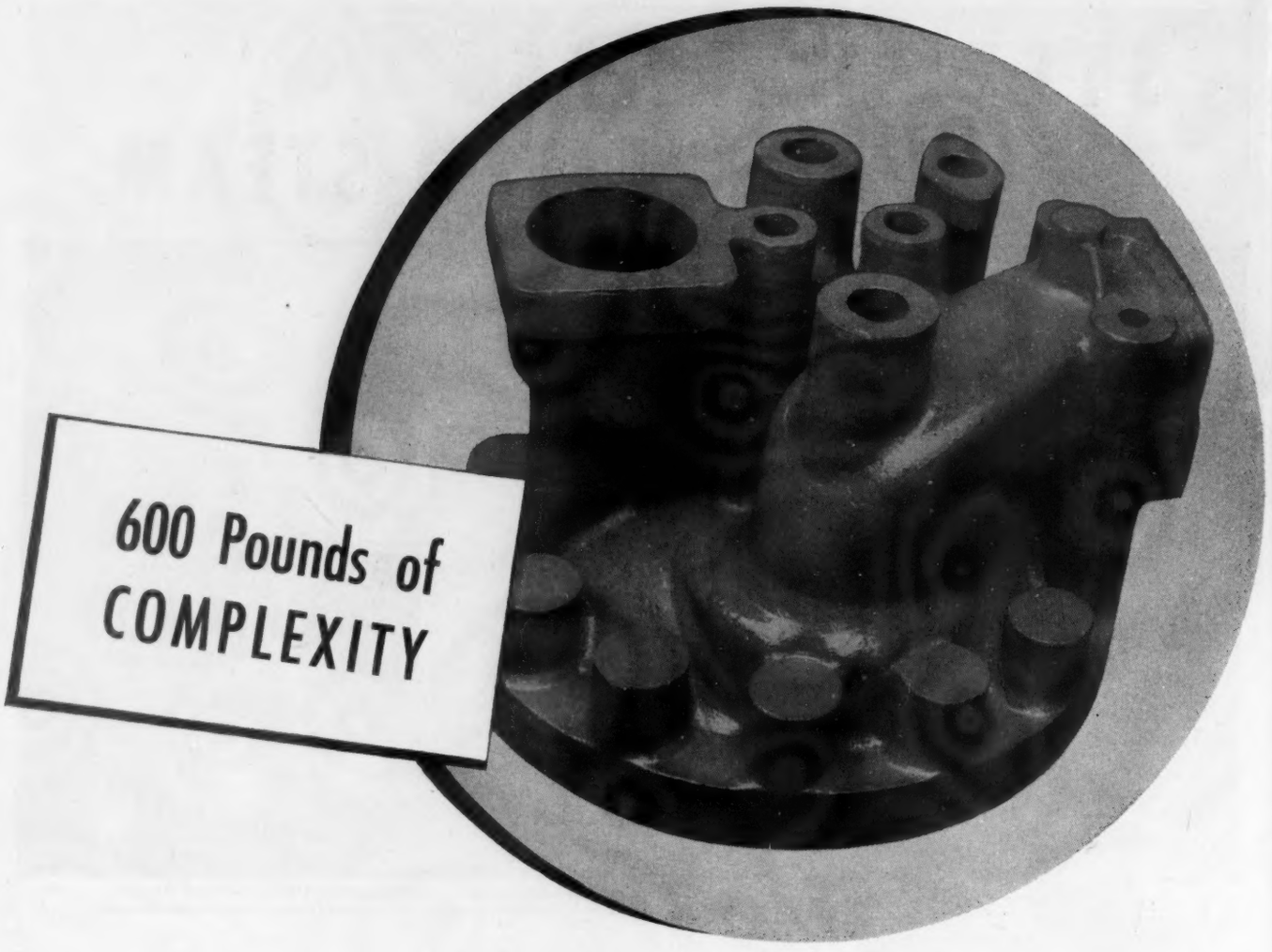
REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic

REPUBLIC STEEL — SERVES THE WORLD

ALLOY STEELS

Electric Furnace • Open Hearth • Stainless



600 Pounds of COMPLEXITY

Your steel foundry no longer hesitates to say, "Bring on your next tough job". Research is constantly adding to broad experience and developing techniques that make the production of tough jobs possible.

Take the Engine Head illustrated here, for example. The casting weighs 600 pounds and must withstand extremes of heat and pressure. It contains accurately cored water jacket passages.

Imagine what a job it would be to cut this from solid metal, or make it by uniting together many smaller units!

Such a job just could not be produced economically by any other method than casting.

We are rapidly approaching a period when cost of production will be an important key to sales volume—in all lines of business.

Have you analyzed your own products to see whether both economy and modernization can be achieved by a wider use of steel castings? Your steel foundryman will gladly work with you.

Or you may feel free to consult, without obligation, Steel Founders' Society, 920 Midland Bldg., Cleveland, Ohio.

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

STEEL CASTINGS

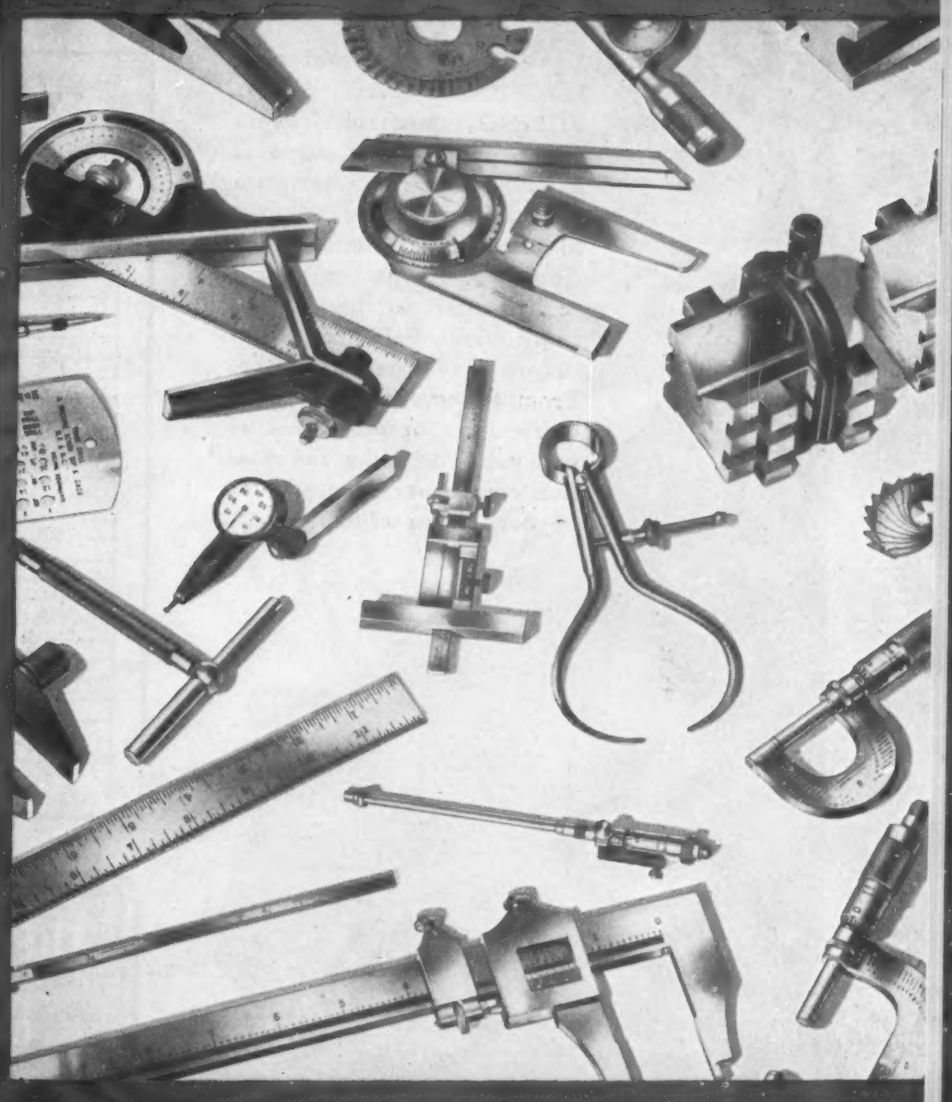
—and Accuracy means Rapid and Economical Manufacture

The choice of Brown & Sharpe Tools by over three generations of skilled users attests their high accuracy and fine qualities. Such advantages, expressed in results, mean good work, accurately sized and produced fast. Catalog sent on request. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

B·S

. . . We urge buying through the Distributor

J. E.



BROWN & SHARPE TOOLS

IF YOUR PRODUCT CALLS FOR ELECTRIC WELDED STEEL TUBING ★★★★★

GET IN TOUCH WITH US

Whatever your problem in ELECTRIC WELDED STEEL TUBING... mechanical, structural or pressure application... it will pay you to investigate our facilities. We are equipped to furnish this material in the diameters and gauges shown in the table at the right, and in many intermediate sizes. Highest quality workmanship. Prompt attention to every inquiry—large or small. Let us help you. For further information, contact our representative in your area, or write us direct.

SIZE AND THICKNESS CHART

★ ★ ★ ★ ★

TUBE DIAMETER	MAXIMUM WALL		MINIMUM WALL	
*O.D. SIZE	DECIMAL	GAUGE	DECIMAL	B.W. GAUGE
1/4"	.065"	16	.028"	22
3/8"	.065"	16	.028"	22
1/2"	.065"	16	.028"	22
5/8"	.065"	16	.028"	22
3/4"	.065"	16	.028"	22
7/8"	.065"	16	.028"	22
1"	.095"	13	.028"	22
1-1/8"	.083"	14	.028"	22
1-1/4"	.095"	13	.028"	22
1-3/8"	.095"	13	.035"	20
1-1/2"	.109"	12	.035"	20
1-5/8"	.120"	11	.035"	20
1-3/4"	.120"	11	.035"	20
1-7/8"	.120"	11	.035"	20
2"	.165"	8	.035"	20
2-1/4"	.180"	7	.035"	20
2-1/2"	.203"	6	.035"	20
2-3/4"	.203"	6	.049"	18
3"	.220"	5	.049"	18
3-1/4"	.220"	5	.065"	16
3-1/2"	.238"	4	.065"	16
3-3/4"	.238"	4	.065"	16
4"	.250"	3	.065"	16
4-1/4"	.250"	3	.065"	16
4-1/2"	.250"	3	.065"	16
4-3/4"	.250"	3	.065"	16
5-1/2"	.134"	10	.083"	14

*Intermediate sizes within the range indicated can also be manufactured. Please consult us for sizes not listed.

THE STANDARD TUBE CO.

Detroit 3, Michigan

Welded Tubing Steel Forgings

★ *Complete Tube Stocks Maintained by* ★

STANDARD TUBE SALES CORP., One Admiral Ave., Maspeth, L. I., N.Y.
LAPHAM-HICKEY COMPANY, 3333 W. 47th Place, Chicago 32, Ill.
UNION HARDWARE & METAL CO., 411 E. First St., Los Angeles 54, Cal.

A few of the many De Laval Worm Gear Reducers used in this plant

Driving a kiln feeder

Driving a kiln

PRACTICALLY NO PARTS REPLACEMENTS in 19 YEARS

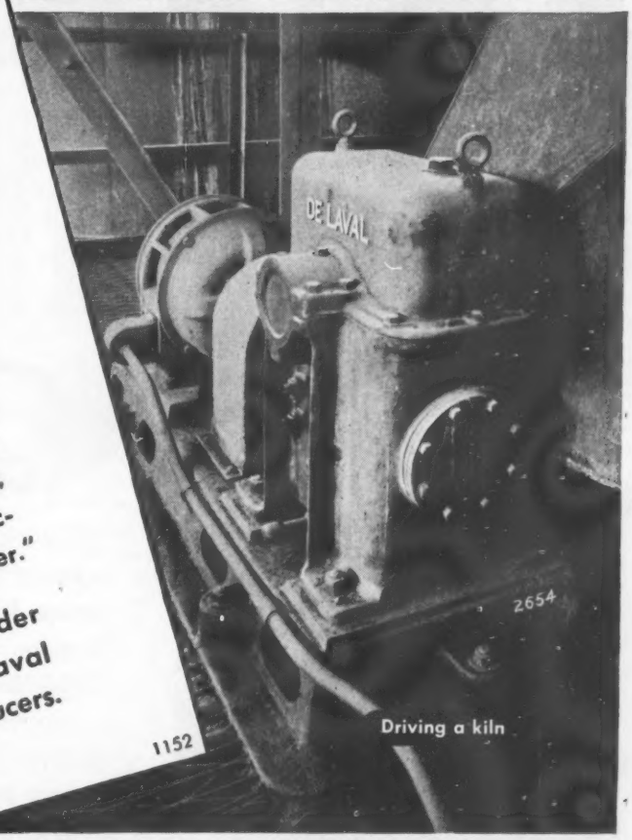
Reported by Plant Employing Many De Laval Worm Gear Speed Reducers

How's that for Reliability?

De Laval Worm Gear Speed Reducers have given such good service in a certain cement mill (name furnished on request) that the Plant Superintendent has written of their performance:

"There are about 175 reducers of various sizes in operation in this plant on a wide diversity of jobs; and during the last eighteen or nineteen years, since the original ones were installed, we have had to make practically no replacements of worms, wheels or bearings. In fact, there has never been any interruption in production by reason of the failure of a speed reducer."

For reliable, trouble-free service under severe conditions, specify De Laval Worm Gear Speed Reducers.



1152

Driving a kiln

TURBINES • HELICAL GEARS and WORM GEAR SPEED REDUCERS
CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS and COMPRESSORS • IMO OIL PUMPS

WORM GEAR DIVISION

DE LAVAL

STEAM TURBINE COMPANY · TRENTON 2, NEW JERSEY

SALES OFFICES: ATLANTA • BOSTON • CHARLOTTE • CHICAGO • CLEVELAND • DENVER • DETROIT • HELENA • HONOLULU • HOUSTON • KANSAS CITY • LOS ANGELES • MANILA • MONTREAL • NEW HAVEN • NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER • ST. PAUL • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • TORONTO • TULSA • VANCOUVER • WASHINGTON, D. C. • WINNIPEG
And Cities in Central and South America

Perfection

all the way through

There was a time when the quality of a bronze bar was a mystery until the mechanic went to work on it. That was before Johnson Bronze introduced *complete machining*. Now the quality is apparent from the start. Every Johnson UNIVERSAL Bronze Bar is entirely usable from end to end . . . no waste . . . no scrap. The range of sizes—over 350—enables you to buy exactly according to your needs. Call in your local Johnson Distributor. Permit him to show you how to save both time and money through the use of Johnson UNIVERSAL Bronze.

JOHNSON
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BRONZE

JOHNSON BRONZE

SLEEVE BEARING HEADQUARTERS

The MOST COMPLETE SLEEVE BEARING SERVICE in the WORLD

550 S. MILL STREET NEW CASTLE, PA.

GOVERNMENT-OWNED WAR SURPLUS

INDUSTRIAL EQUIPMENT

FOR SALE

Our inventories of Industrial Equipment include practically every type and make needed to meet industry's reconversion needs! A large percentage of this equipment is new, or little used—and every item is priced low for quick recovery.

Get in touch with the RFC Agency Office nearest you and outline your needs. Act quickly—this equipment must be sold at once!

HEAT TREATING FURNACES

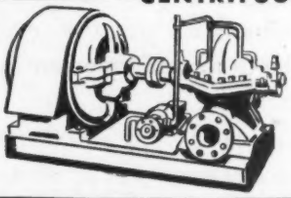
Disposal surplus heat-treating furnaces of practically every size and type for ferrous and non-ferrous applications, such as: normalizing, annealing, tempering, hardening, case hardening, surface hardening, nitriding, cyaniding. Batch type: car, box, pit, salt bath. Continuous types: portable and foundation designs. Fuel: gas, oil, electricity (high and low frequency).

MACHINE TOOLS

Government-owned surplus tools of every description being released to industry can help you reconvert. It is the job of the War Assets Corporation to dispose of this surplus property quickly and effectively. Toward that end we ask you to follow this simple 3 step procedure:

1. Submit in writing your requirements for machine tools and industrial equipment to us now.
2. Send a typewritten list to your nearest office listed below.
3. Make your descriptions brief, one line if possible, clearly grouping various types of equipment you need.

CENTRIFUGAL PUMPS



Available at most agencies in sizes 1½" to 6", complete with prime mover, usually electric motor driven.

Write, wire or phone your requests to the nearest RFC agency listed below for more detailed information. Credit terms may be arranged. If your local office does not have all the equipment you need, it will endeavor to locate it from other offices throughout the country.

VETERANS: To help you in purchasing surplus property from War Assets Corporation, a veterans' unit has been established in each of our Disposing Agencies.

CHECK THIS LIST FOR THE EQUIPMENT YOU NEED

Check the types of equipment on which you desire further and continuing information. Mail the coupon to your nearest RFC office listed below. Your name will be placed on our regular mailing list.

- ☐ Heat-treating furnaces (for all purposes)
- ☐ Gantry type cranes
- ☐ Extrusion Presses
- ☐ Electric and Pneumatic tools
- ☐ Centrifugal and rotary pumps
- ☐ Welding equipment
- ☐ Chemical equipment
- ☐ Thermal dryers-dehydrators
- ☐ Generator sets (internal combustion engine driven)
- ☐ Baling presses
- ☐ Electric copper cable
- ☐ Anti-friction bearings
- ☐ Bonded and coated abrasives
- ☐ Cutting tools

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15-277

A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY ADMINISTRATION for Surplus Producers' and Capital Goods, Aircraft and Plants formerly handled by Reconstruction Finance Corporation . . . and for Surplus Consumer Goods formerly handled by United States Department of Commerce.

WAR ASSETS CORPORATION

(A SUBSIDIARY OF RECONSTRUCTION FINANCE CORPORATION)

RFC OFFICES (INCLUDING FORMER DEPARTMENT OF COMMERCE REGIONAL SURPLUS PROPERTY OFFICES) LOCATED AT: Atlanta • Boston • Chicago • Denver • Kansas City, Mo. • New York • Philadelphia • San Francisco • Seattle • OTHER RFC SURPLUS PROPERTY OFFICES LOCATED AT: Birmingham • Charlotte • Cleveland • Dallas • Detroit • Helena • Houston • Jacksonville • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • Oklahoma City • Omaha • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • Spokane • OTHER FORMER DEPARTMENT OF COMMERCE REGIONAL SURPLUS PROPERTY OFFICES LOCATED AT: Cincinnati and Forth Worth

HOT-DIP GALVANIZING

provides the utmost in rust prevention

A reproduction of actual photomicrograph, showing protective bond of zinc which only the Hot-Dip Galvanizing process provides.

The infallible testimony of the microscope reveals why the application of molten zinc through the Hot-Dip Galvanizing process provides the *utmost in rust prevention* . . . The protective zinc (**A**) is first *bonded* to the base metal (**D**) by an iron rich alloy (**C**)—then a layer of rich zinc alloy (**B**)—obtainable only through the Hot-Dip process, *seals out* the destructive elements that are the cause of rust and corrosion.

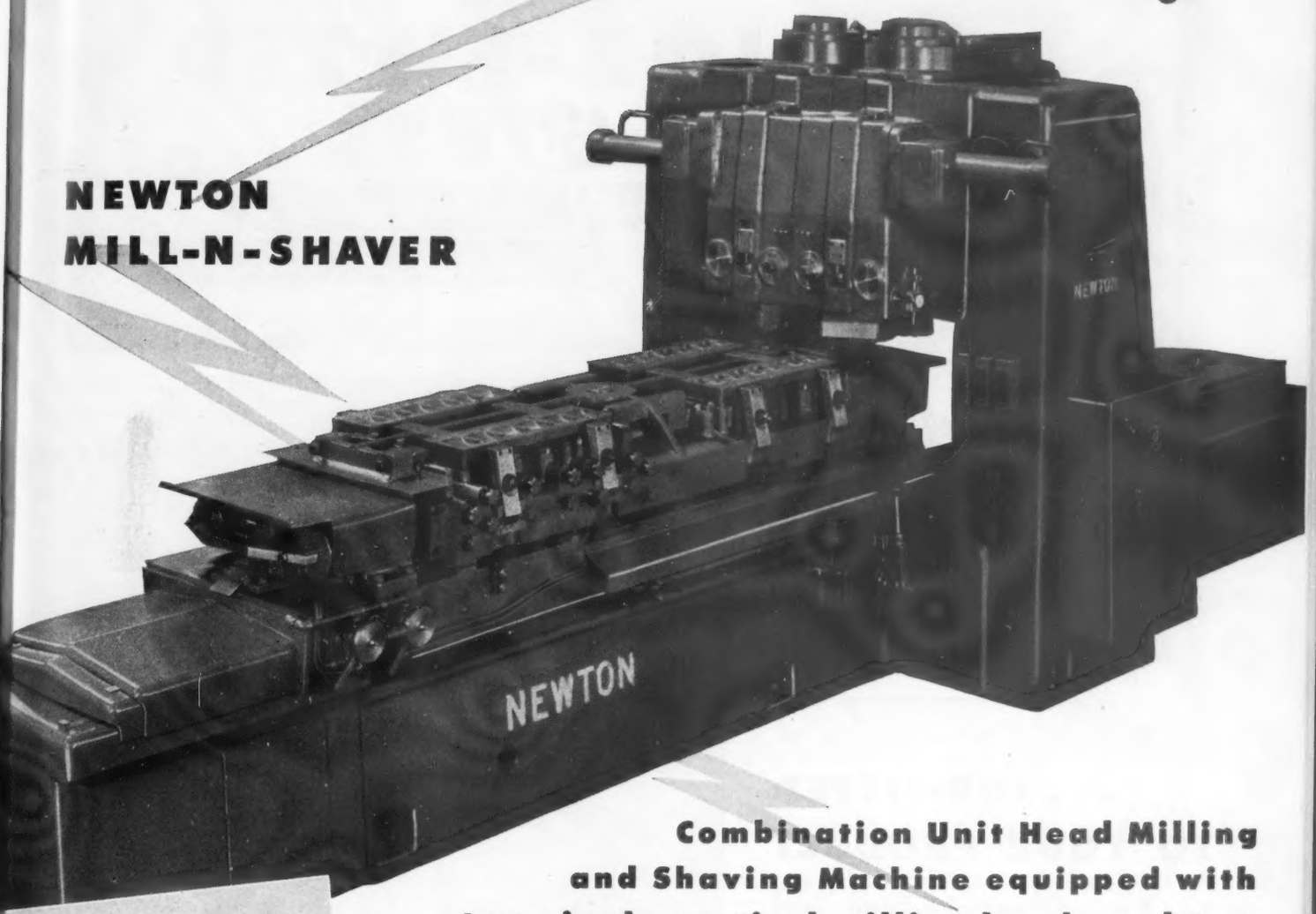
Time has proved by thousands of case histories that the Hot-Dip Galvanizing method, as employed by members of this Association, does provide longer life, greater uninterrupted service and effects tremendous savings in expensive maintenance and replacement costs.

For information in regard to *your* particular corrosion problems, address American Hot Dip Galvanizers Association, Inc., First National Bank Building, Pittsburgh 22, Pennsylvania.

For the best Zinc Coating use hot-dip GALVANIZING

TWO SEPARATE OPERATIONS in the time required for rough milling—alone!

NEWTON MILL-N-SHAVER



Combination Unit Head Milling and Shaving Machine equipped with two single vertical milling heads and two finish shaving heads. Hydraulic feed to table.

The Newton Mill-N-Shaver performs two complete operations at one pass of the table. It rough mills at milling speed and finish shaves on the return, at the rapid traverse speed. This machine produces a perfect gasket surface. Two separate operations in exactly the time ordinarily required for rough milling alone. The Newton Mill-N-Shaver is designed to both step-up your production and reduce your costs on the types of work for which this machine is adapted. For detailed information, write for Bulletin No. 580.

Among Heavy Machine Tools built by Consolidated are . . . .

LATHES
BORING MILLS
DRILL PRESSES
MILLING MACHINES
BORING MACHINES
COLD SAW MACHINES
PLANERS
SLOTTERS
RAILROAD SHOP TOOLS
AUTOMOTIVE TOOLS
AND OTHER
SPECIAL MACHINES

BUILDERS OF HEAVY DUTY MACHINE TOOLS SINCE 1861

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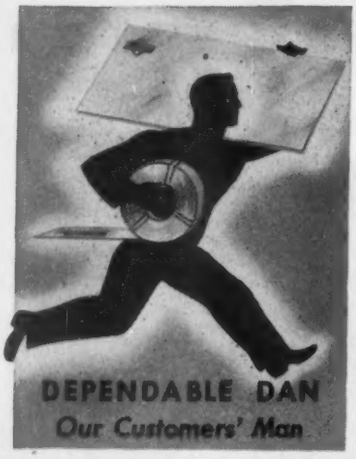
CONSOLIDATED MACHINE TOOLS

CONSOLIDATED
MACHINE TOOL CORPORATION

ROCHESTER 10 NEW YORK

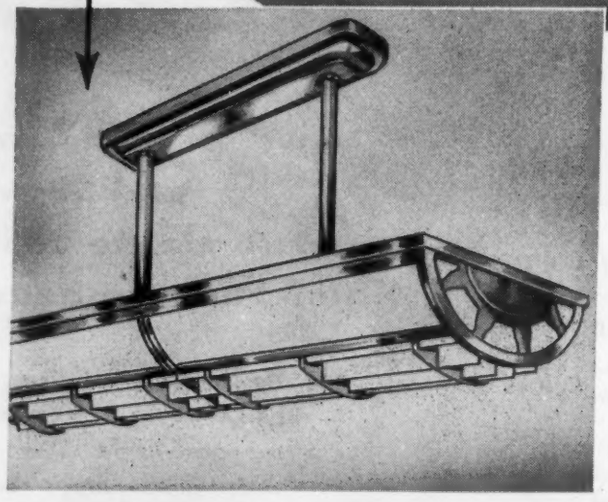


RELIANCE

JOB-FITTED STEEL

The Invisible Mark of Quality in Your Product . . .

FROM *Lighters* TO *Lamps*



. . . JOB-FITTED TO YOUR PRODUCT

When Reliance Job-Fitted Steel goes into your product, it gives up its own identity but in doing so, it imparts strength, beauty, serviceability and endurance. It makes for speedy, smooth production at low cost.

RELIANCE STEEL DIVISION

Detroit Steel Corporation

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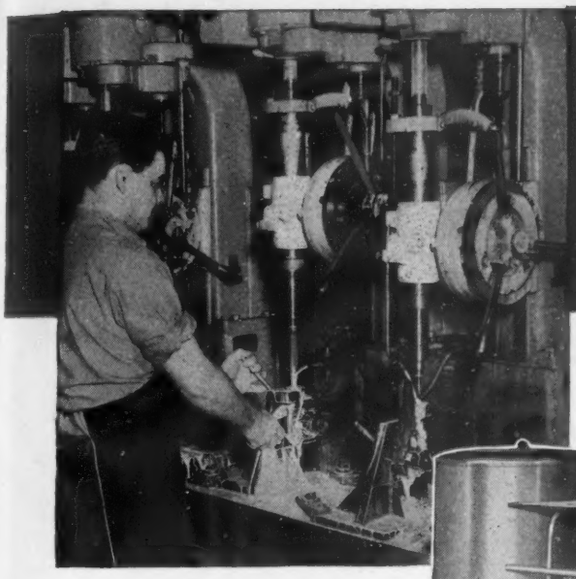
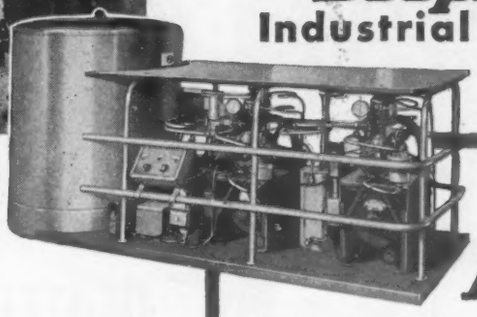
SALES OFFICES: GRAND RAPIDS*, INDIANAPOLIS*, NEW HAVEN, PHILADELPHIA, ST. LOUIS, TOLEDO*
RELIANCE STEEL CORP. OF CANADA, WINDSOR, TORONTO

ALUMINUM SHEETS *and* STRIPS—available through locations marked*



Reamer Life Increased from 5 to 15 Hours per Grind

by Cold Treating in a Deepfreeze Industrial Chilling Machine



INCREASED TOOL HARDNESS AIDS PRODUCTION BY REDUCING MACHINE DOWN TIME... CONSERVING VALUABLE MAN-HOURS

● Here's how this large eastern manufacturer improves a whole production setup by increasing the life of standard reamers. One phase in the manufacture of air brake equipment is the reaming of slack adjusters. Originally the life of the reamers used was five hours per grind. By subjecting them to a simple, inexpensive treatment in the Deepfreeze Industrial Chilling Machine, tool life was increased to fifteen hours per grind.

This 300% increase in tool life has far reaching results on production in general. Machine down-time is drastically reduced. Considerable manpower is conserved and made available for other operations. Rate of production is increased. The additional hardness attained provides a reaming surface that improves job quality.

Deepfreeze Offers You Assistance in Adopting Cold Treating to Your Production

The life of any type of metal cutting tool—drills, taps, mills hobs, etc.—can be appreciably increased by a similar cold treatment. And to increase metal hardness is only one of the many purposes of cold treating. It is used with the same timesaving efficiency and economy to stabilize precision instruments; contract parts for shrink-fit assembly; test aircraft parts; and for numerous miscellaneous purposes. To determine exactly how and with what results cold treating can be applied to your production, contact Deepfreeze Engineering Service. This group of industrial refrigeration experts is maintained to aid in the solution of any of your cold treating problems, without obligation.

HERE'S HOW a Deepfreeze Industrial Chilling Machine Can be Used in Your Plant!

Hardening:
To increase the hardness and ductility of all types of metals and thereby improve the quality and longivety of metal products, especially high-speed steel tools.

Stabilization:
To eliminate with speed and certainty the growth and consequent distortion that takes place in precision products with the passage of time.

Shrink-Fit:
To speed the assembly of metal parts where one must fit within another and eliminate the excessive costs and spoilage typical of press-fit and other traditional methods.

Testing, etc.:
To predetermine the reaction of items used in low temperatures, such as aircraft parts, etc., and the accomplishment of numerous other time and money-saving operations that tend to increase general production efficiency.

FREE... A Complete History on Cold Treating...
... Forty pages of useful facts and figures including performance data stories, successful procedures used, charts, tables, Deepfreeze user list and numerous other cold treating information that will aid your production. Send for your copy, today.

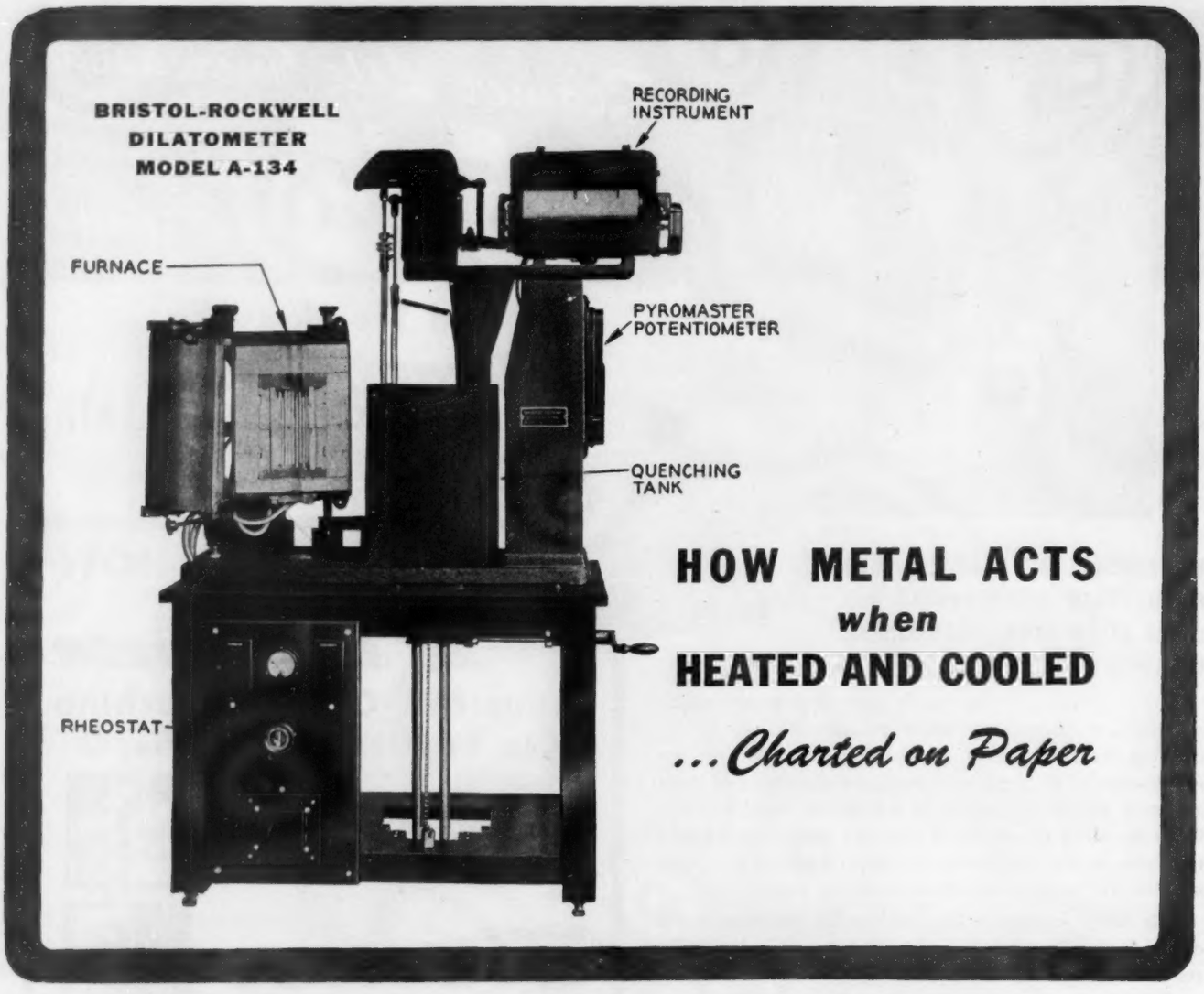
Only Motor Products can make a "DEEPFREEZE"

Deepfreeze

Industrial Chilling Equipment for Shrinking, Testing, Hardening and Stabilizing Metals

DEPT. S-1, 2301 DAVIS ST.
NORTH CHICAGO, ILLINOIS

MOTOR PRODUCTS CORPORATION
DETROIT, MICHIGAN



You can get four important types of information about temperature effects on metal—easily and accurately—from the improved model of the Bristol-Rockwell Dilatometer:

- **Critical points of carbon steel**
- **Coefficients of expansion**
- **Composition (from thermal curves)**
- **Heating rates and heat saturation**

Temperature-dilatation and temperature-time changes are recorded simultaneously during heating and cooling cycles.

The built-in electrical furnace (rheostat-controlled) heats to 2500°F. It takes samples up to 5″ x 1⅝″ (best sample sizes: 2½″ to 3½″ long). Ferrous and non-ferrous metals can be tested.

Quenching Tank

An added feature is the quenching tank which can be raised to the quench position without moving the sample or interfering with the dilatation measuring system.

For full information send for Bulletin No. W1803

...Gives YOU the Most from Heat

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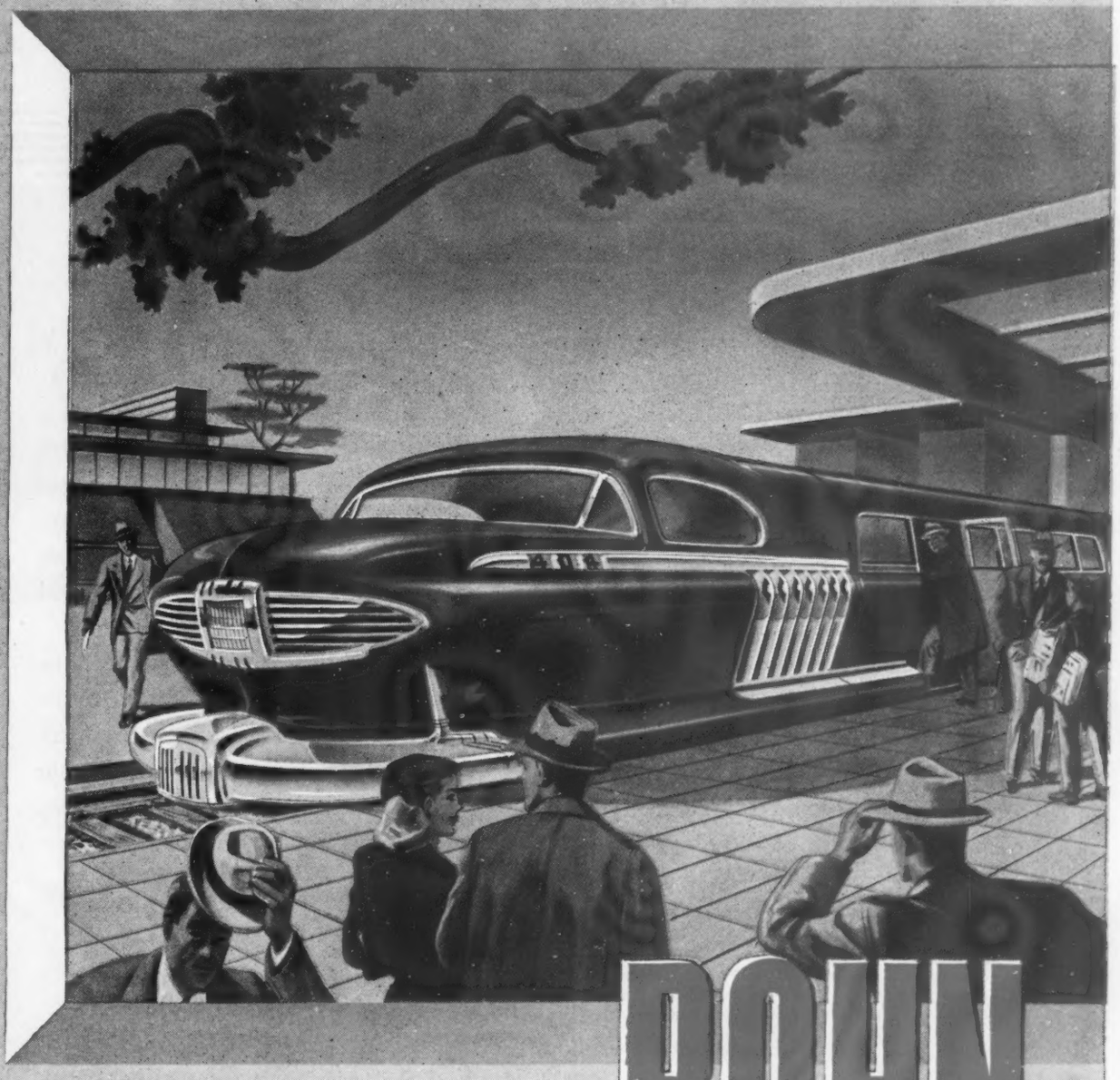

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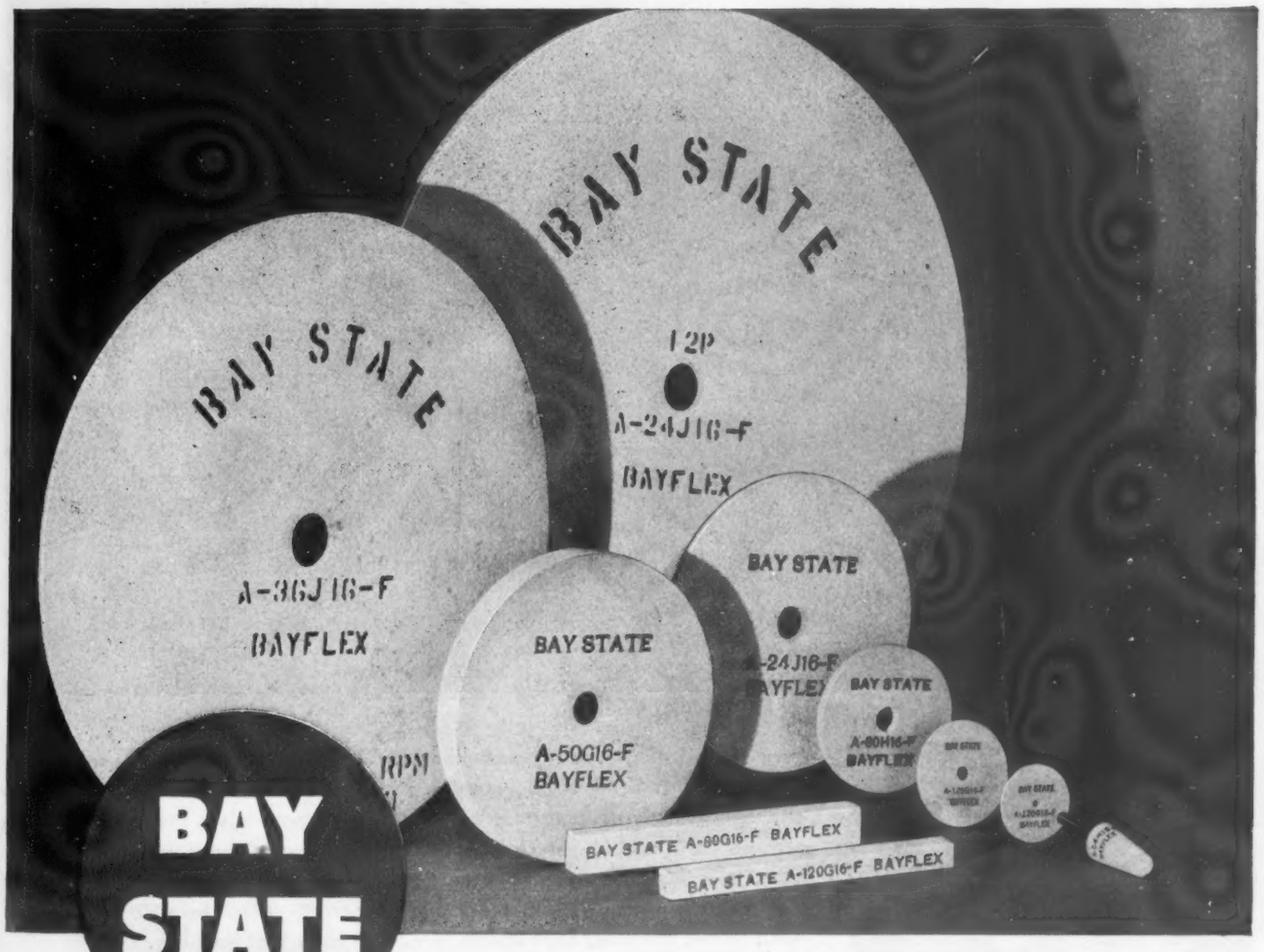

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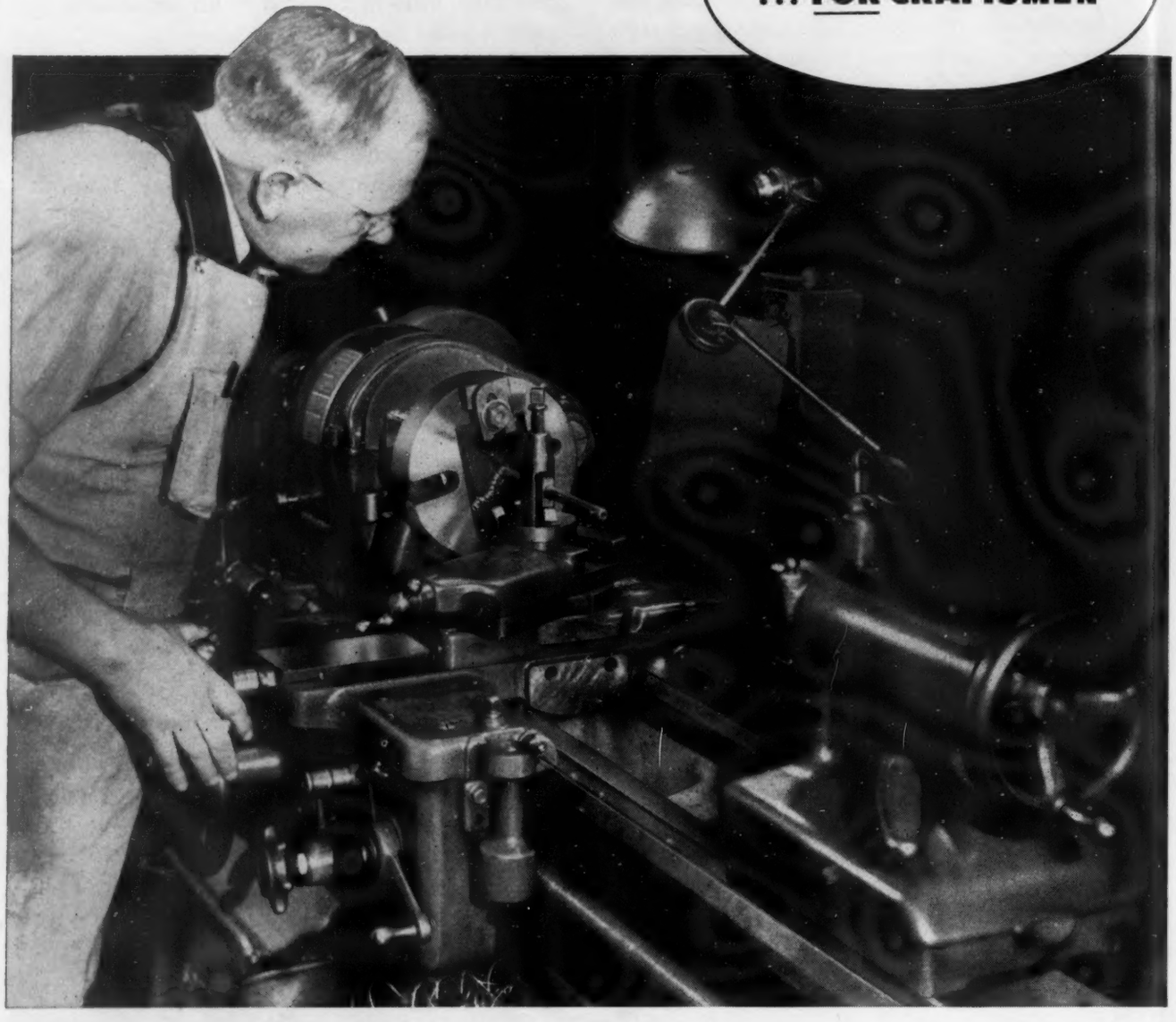

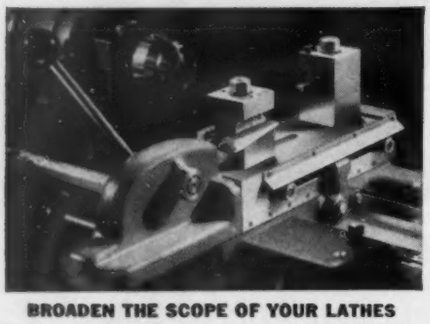

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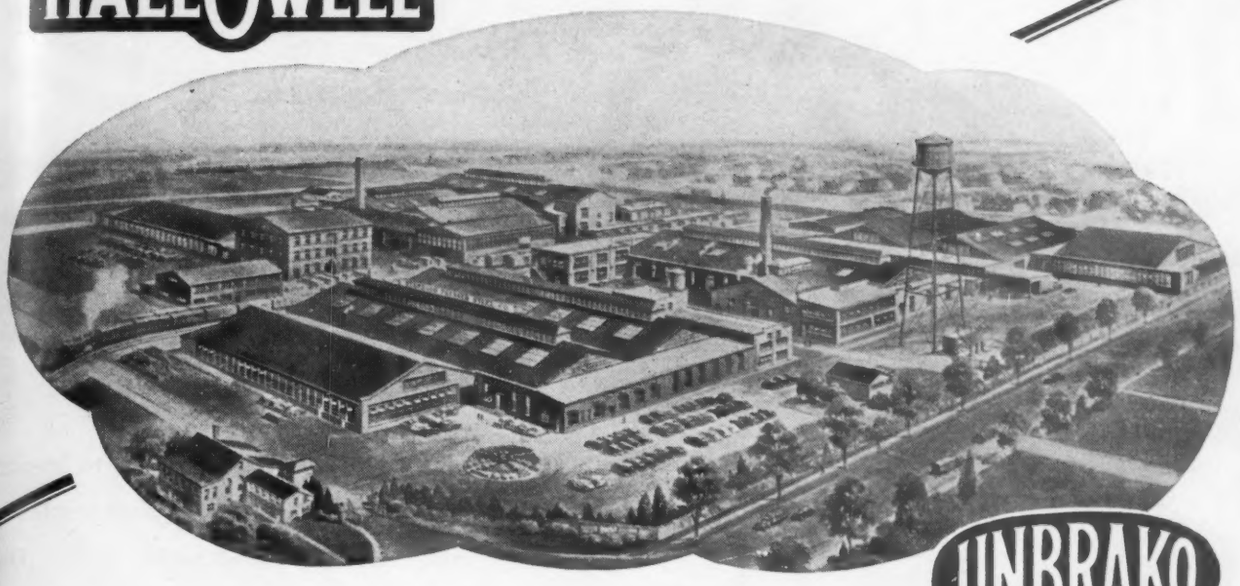

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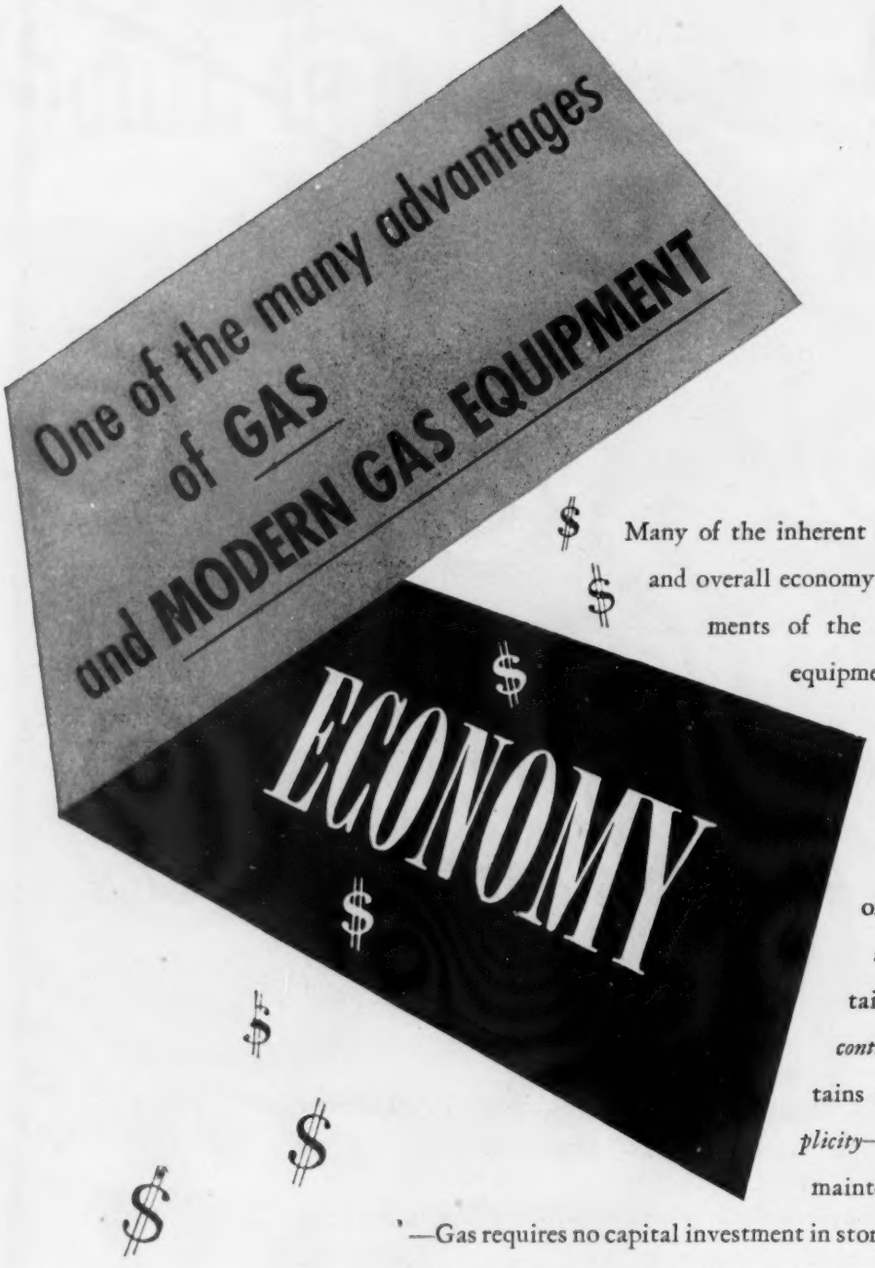

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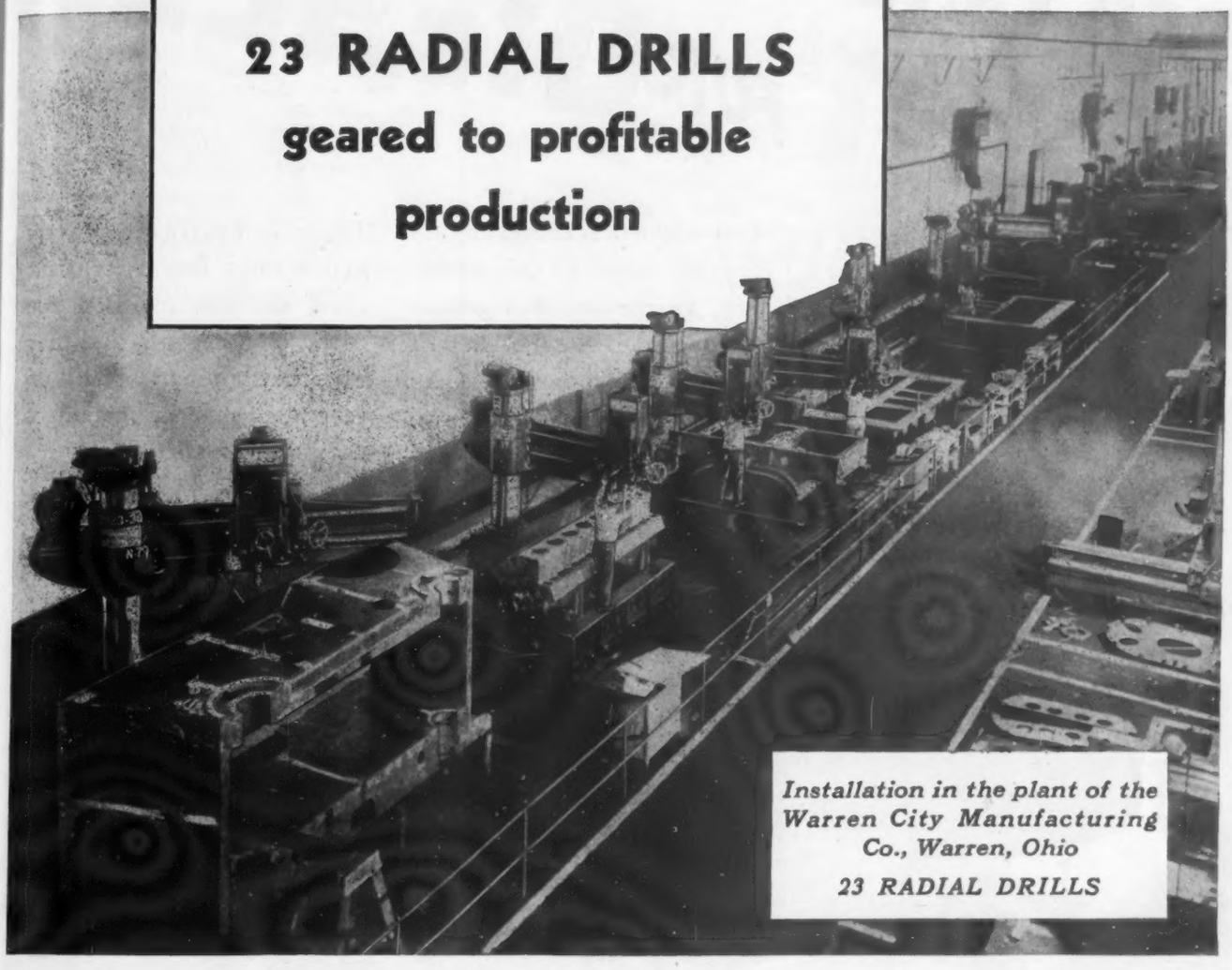

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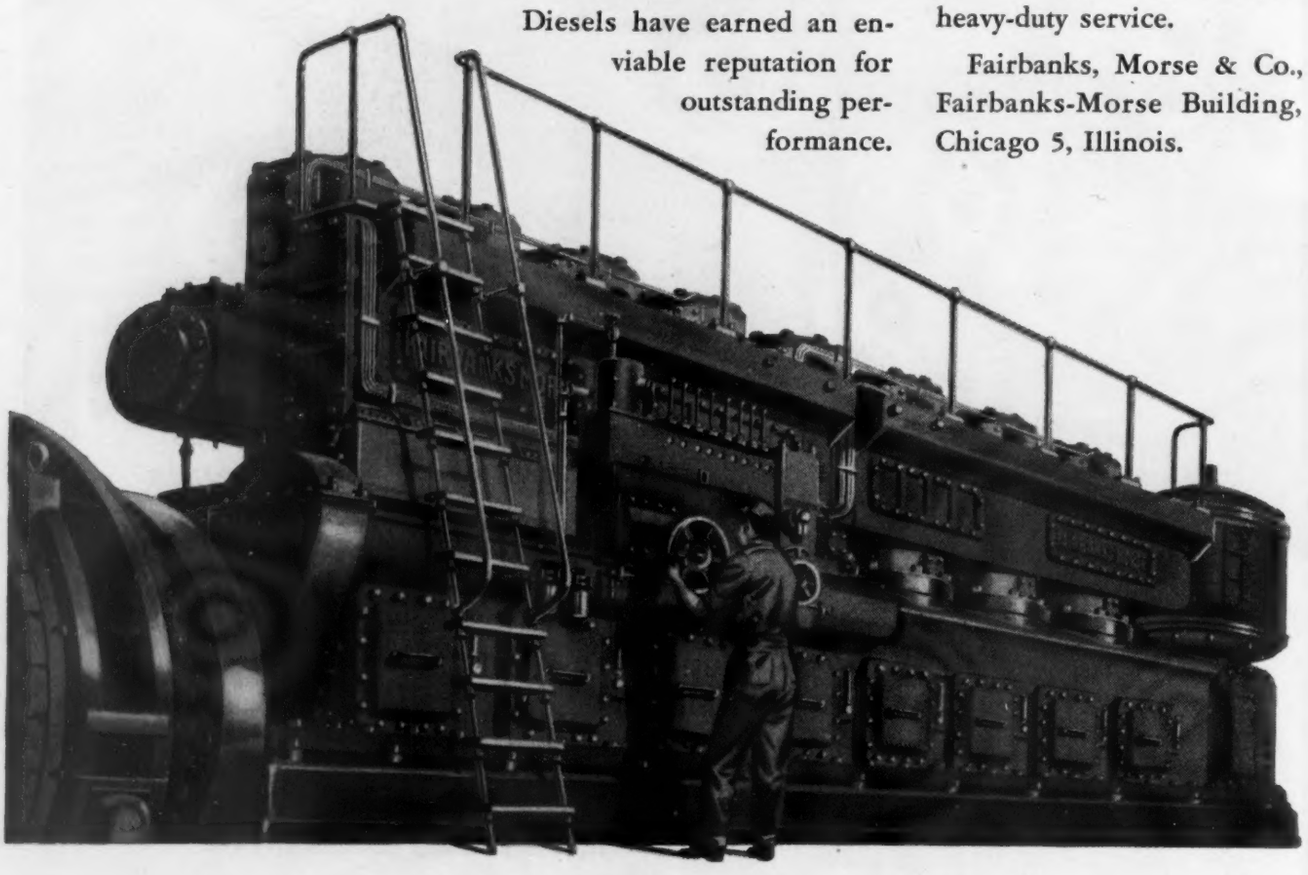

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 118, NO. 5 FEB. 4, 1946

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Fastening System Has 3000 Modifications

ENGLISH REPRESENTATIVE: INTERNATIONAL CONSTRUCTION CO., 56 KINGSWAY, LONDON, W.C. 2, ENGLAND

As the EDITOR VIEWS the NEWS

Economic Illiteracy

To date the record of strike settlements argues strongly in favor of bargaining without government intervention and against participation by the government in any form.

The agreements negotiated by Ford and Chrysler were consummated independently of federal action. The settlement effected by employers and employees in the oil industry was achieved largely by the companies and unions after clumsy maneuvering by the government had almost ruined any chance of agreement. It is possible that the government should receive some credit for the ending of the meat crisis, but this is debatable. In the case of the U. S. Steel and General Motors disputes with unions, there are grounds for the belief that their differences might have been resolved sooner if the government had not stepped into the picture.

The burden of this evidence seems to prove that President Truman was right in his first, intuitive hunch immediately following V-J Day, when he declared that the government should get out of labor disputes and permit management and labor to resume true collective bargaining. He later reversed his position on this because his advisers, including CIO, sold him on the idea that deflation threatened, that 8 million would be out of jobs by the year-end, and that reduced purchasing power would lead to early depression.

Despite the fact these advisers have been proved wrong and that inflation rather than deflation is the more immediate threat, the President permitted the government to be drawn into some of the disputes. Through its inept participation it has not only retarded industrial peace but it has also suffered a tremendous loss in prestige.

The object lesson to be drawn from this tragic experience is clear. The cold fact is that the President's thinking and much of important government policy is based upon the amateurish and dangerous conclusions of White House advisers who are woefully deficient in their knowledge of the fundamentals of economics. When Mr. Fairless of U. S. Steel suggested a conference to discuss "what kind of wage increase the economy of this nation can endure without incurring the danger of an inflationary spiral with a constant race between mounting wages and mounting prices," the President at a press conference brushed it aside as if it were irrelevant.

Economic illiteracy is one of the great curses afflicting this potentially great nation. It exists in high and low places. It is far too prevalent. The safety of the republic demands that this glaring weakness be corrected promptly.

STEEL

February 4, 1946

WHY ARE WE SO DUMB? Last week a Reuters dispatch from London, commenting on the British Labor cabinet's move to provide a fund of $200 million to encourage and aid private enterprise in the Empire, contained a number of statements which should be significant to Americans who have concluded too hastily that Britain is turning "leftish."

One of these statements is "Dilatoriness usually costs Britain more than precipitancy costs the United States. The United States steps high, wide and handsome and so sometimes stumbles, but when it is not stumbling it is going places fast."

Another Reuters statement: "It is not for nothing that the economic power of the United States, with about one-fifteenth of the world's population, equals that of all the rest of the world put together."

Isn't it odd that when Britain, all of Europe, China and Russia all are striving to find the formula that has made America great, our leaders—for the most part—are listening to advisers who would destroy that formula and who would forsake our

(OVER)

hard-won economic advantages for the desperate plight of those nations which envy our success?

Our system of relatively free private enterprise is the hope of the postwar world. Why do we apologize for it when we should be nourishing it and making it stronger?

• • •

DWINDLING RESERVES: In his annual report to the President, Secretary of the Interior Harold L. Ickes calls attention to the "staggering" drain imposed by the war upon this nation's natural resources and advocates conservation, importation and stockpiling of metals which are in short supply.

According to his report only nine of the major minerals remain in our known domestic reserves in sufficient quantity of usable grades to last 100 years or more. These are iron ore, nitrogen, magnesium, salt, bituminous and anthracite coal, phosphate rock, molybdenum and potash. Our known usable reserves of 22 essential minerals have dwindled to a 35-year supply or less. Among these are manganese, vanadium, tungsten, petroleum, copper, lead, tin, zinc, nickel, bauxite, chromite, cadmium, cobalt and coking coal.

Technological progress and a more efficient use of minerals will extend the life of some of the reserves, but this should not deter us from acting decisively now to restore as much of the wartime drain as possible. —p. 97

• • •

TRANSIT BY PIPE LINE: Performance during the war of "Big Inch," "Little Inch" and other large-diameter pipe lines in the United States and of smaller-diameter lines in England, across the English Channel and from the Normandy beachheads to the fighting fronts in Germany has given the world a new appreciation of the importance of pipe line transportation.

Behind these spectacular achievements is an impressive story of engineering development. Since 1927, by virtue of improved techniques, the working stresses in large-diameter steel pipe have increased from 10,000 to 40,000 psi and at the same time it has been possible to reduce the safety factor on yield strength from 4 to 1¼. Today 40-foot lengths of large diameter steel pipe are being bent to cylindrical shape, butt welded in massive million-ampere flash welding machines and finished to exacting specifications on a mass production basis which should further stimulate transportation by pipe line. —p. 120

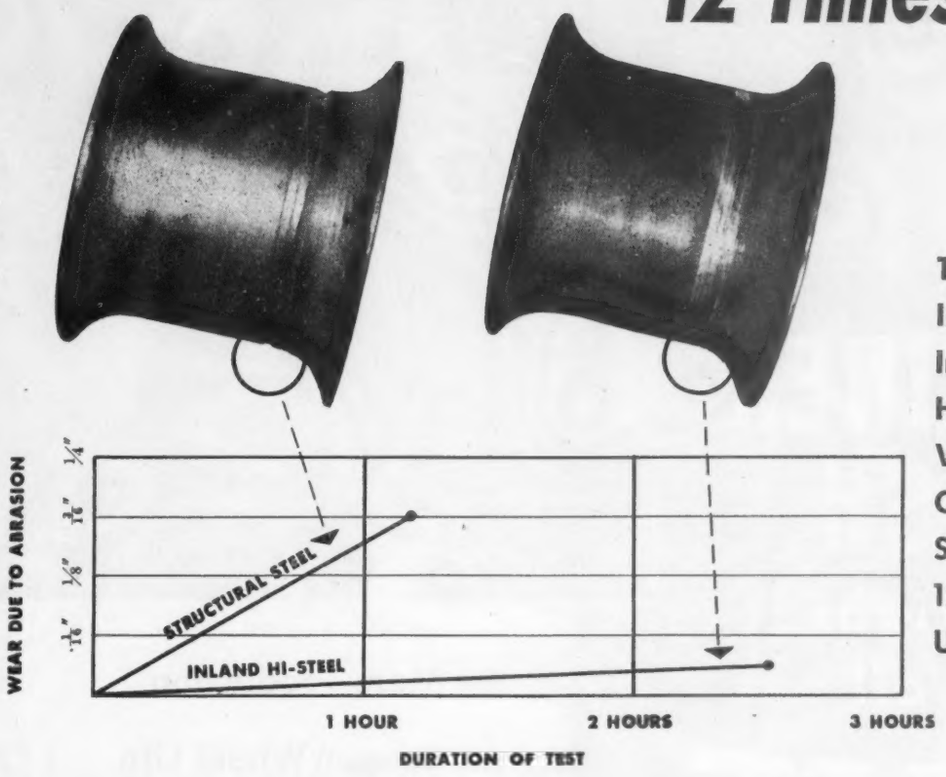
SIGNS OF THE TIMES: France has placed orders for 23,250 box cars and 4000 gondolas (p. 102) with American Car & Foundry Co., Pressed Steel Car Co. and Pullman-Standard Car Mfg. Co. . . . The wage agreements signed by Ford and Chrysler with the UAW-CIO will increase the annual payrolls of those corporations (p. 105) by $40 million and $24 million, respectively. . . . Interstate Commerce Commission will have to resolve a dispute between Pacific Coast and Midwest companies as to the disposition of 300,000 tons of high-grade shipyard scrap. Transcontinental railroads requested ICC to approve a reduction in the freight rate for the shipment of scrap from the West Coast to the Chicago area from $14.78 to $12.32 per long ton for a four-month period. Western steel interests oppose the reduction (p. 111) on the ground that the scrap is badly needed in the Pacific Coast area. Midwest interests argue that the reduction is justified because the Coast has a surplus of scrap, as evidenced by the fact scrap prices in the Pacific area are falling below OPA ceilings. . . . Although the Patent Office is struggling hard to carry the heaviest load of patent applications in its 156-year existence (p. 98), it has speeded up certain services appreciably. A year ago manufacturers had to wait from two to five months to get "soft copies" of patents. Today it takes 24 hours to service over-the-counter sales, three days to fill mail orders accompanied by cash and up to three weeks to fill charge-account orders. Moral: If you are in a hurry, have a Washington representative buy your copy over the counter or send cash with your mail order. . . . A steel foundryman turning out about 900 tons of 700-lb. electric motor housings annually was not happy when he discovered that 25 per cent of these castings were rejected after an average of $82 of machining time had been wasted on each. He installed x-ray equipment for the inspection of pilot castings (p. 143) and on the item of motor housings alone saved $50,000 annually. . . . The irrepressible Henry J. Kaiser now announces the "Kaiser Jet-Propelled Dish-Washing Machine," product of the Kaiser Co. Inc., Bristol, Pa. The "jet-propelled" adjective (p. 109) is derived from the fact that the dish washer is powered by pressure of water coming from the household water system.

E. L. Shaner

EDITOR-IN-CHIEF

Resists Abrasion . . .

12 Times Longer!



Tests Show That Inland HI-STEEL,* In the Precipitation Hardened Condition, Will Outwear Ordinary Structural Steel More Than 12 Times When Used For Winch Heads

*TRADEMARK—REG. U. S. PAT. OFF.

Recent tests were undertaken by American Hoist & Derrick Co., St. Paul, Minn., to determine the comparative wearing qualities of winch heads—made of Hi-Steel in the precipitation hardened condition and of ordinary structural steel. To simulate actual field operation as closely as possible, the steel cable around the winch was held under load and the winch revolved. Both winch heads were of identical size and shape. In the first test of 70 minutes with ordinary structural steel, and in the second of 150 minutes with Hi-Steel (as indicated by the graph above), Hi-Steel's exceptionally higher resistance to abrasion was clearly demonstrated.

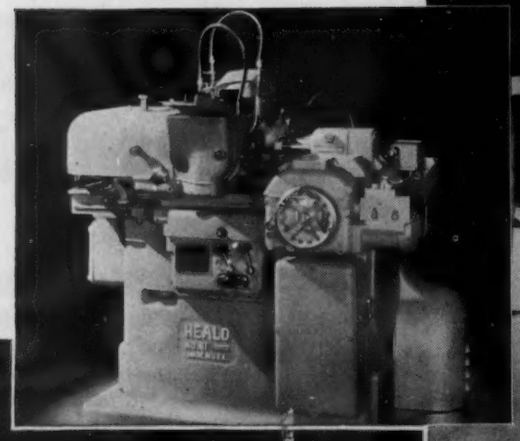
Along with superior resistance to wear, Hi-Steel also offers you a high strength steel—permitting considerable weight reduction while maintaining the required structural strength—as well as great resistance to fatigue, impact, and atmospheric corrosion.

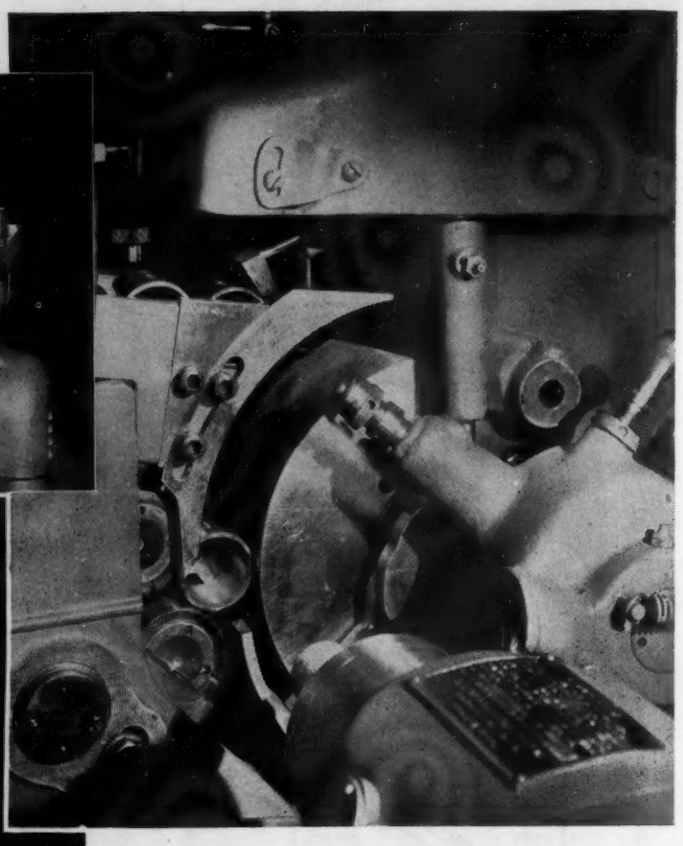
Since Inland Hi-Steel can be furnished in most structural sections, plates, strip and sheets, and is economical to use, its applications are many and varied.

A partial list of products in which Hi-Steel is successfully used: Bins, Boats, Bolts, Booms, Bridges, Buckets, Busses, Chutes, Construction equipment, Conveyors, Cranes, Cyclone stacks, Locks, Floor Plates, Hoists, Hoppers, Material handling equipment, Mine equipment, Ore cars, Railway cars, Screens, Stacks, Structural framework, Tanks, Trailers, Trucks and Ventilators.

Write for the Inland Hi-Steel Engineering Bulletin No. 11. Inland Steel Company, 38 S. Dearborn St., Chicago 3, Ill. *Sales Offices:* Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul. *Principal Products:* Bars, Structurals, Plates, Sheets, Strip, Tin Plate, Floor Plate, Piling, Reinforcing Bars, Rails, Track Accessories.

INLAND HI-STEEL





FOR FINER FINISH

use the right grinding oil

GET...

★ **More Production**

★ **Longer Wheel Life**

★ **Less Scrap**

REGARDLESS of the metal or type of grinding, Texaco oils assure all the benefits listed above, plus these additional advantages:

1. *Cool the work quickly,* preventing distortion from high frictional heat.
2. *Prevent loading* of grinding wheel, promoting faster cutting.
3. *Settle grinding dirt quickly.*
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STEEL
February 4, 1946

Industry voices its opinion on the shape the future labor relations legislation should take. Here Stephen DuBrul, director of labor economics for General Motors Corp., testifies before the Senate Committee on Education and Labor. Shown in background is C. E. Wilson, GM president, who also testified before the committee. NEA photo

Steel Strike Strangling Economy

Metalworking shops closing or sharply curtailing operations as steel inventories near exhaustion. Thousands of workers made idle. New proposal to control labor disputes gains favor in Congress. Plight of struck fabricating plants continues gloomy

CHOKING effects of the steel strike on the nation's economy were becoming widely apparent as the stoppage concluded its second week.

Inventories of steel-consuming industries, lower than normal when the walkout started, were nearing exhaustion. Many plants were closing down or sharply restricting operations. Thousands of workers in plants not directly affected by the steel strike were made idle because of a shortage of steel with which to work.

Construction projects, including urgently needed housing, were interrupted for lack of building materials. Industrial expansion projects, intended to round out facilities for production of civilian goods, were disrupted.

This strangulation of industrial activity grows more acute with every day the strike continues. Its effects will be felt for a considerable period after the mills reopen, as several weeks will be required to resume shipments of a full line of products and to replenish depleted stocks of steel users. Further delay will be involved in shipments of fabricated products to the ultimate consumers.

Meanwhile efforts to settle the controversy moved under cover in Washington. Reporters covering the national capital reported "mysterious" comings and goings of top industrial figures in the capital, but officials were secretive concerning the conversations taking place.

These generally were believed to concern the amount of steel price increase the government would grant producers. United States Steel Corp. officials stated government spokesmen had intimated the original offer of $4 a ton would be increased if the strike could be settled.

In Congress, sentiment for strike control legislation was growing, with a measure offered by Rep. Francis Case (R., N. Dak.) holding the spotlight. The Case bill would set up a tripartite mediation board patterned after the National War Labor Board, provide for the status quo or cooling-off periods which would be enforced by court injunctions, and would in addition place a stringent curb on some of the present practices of labor unions.

Boycotts and sympathy strikes would be outlawed and the Norris-La Guardia Act would be amended to restore to federal courts powers to issue injunctions in labor disputes. Individuals guilty of violence would lose any protection guaranteed by the Wagner Act.

The bill would make employers and labor unions equally liable under the law for violations of their contracts. Suits for damages or for injunctive relief could be filed for breach of contract.

The Case bill was backed by a coalition of Republicans and southern Democrats and apparently was slated to replace the diluted version of President Truman's fact-finding legislation. The latter proposal, which at best was coolly received by industry, labor and Congress, appeared to be losing ground in congressional hearings.

Meanwhile, no solution appeared in sight for the problem of the some 700 steel fabricating and converting companies struck by the United Steelworkers. These firms, which basically are not steel producers, are being squeezed from

both sides in the current dispute. The union demands they increase wages to the same extent as the basic steel producers. On the other side, the fabricators will be forced to pay higher prices for their raw material (steel) to the extent that a price increase is granted the steel producers.

These companies produce a wide variety of products, prices of which generally are frozen by the Office of Price Administration. So diversified are these products that months would be required for OPA to review the various cases and grant individual price relief to compensate for higher wages and higher costs for raw materials.

Chicago district officials of United Steelworkers announce that seven small plants in the district employing about 2000 workers have negotiated contracts with the union "providing for wage increases of 18½ cents an hour or better." None can be classified as steel producers.

Strike conditions in the various metalworking centers are outlined in the following reports from STEEL's district editors:

GM To Insist on No-Strike Provision in Contract

General Motors Corp., which last week renewed negotiations with the United Automobile Workers, announced it will insist upon satisfactory contract provisions insuring uninterrupted production and efficient worker effort before it will increase its wage increase offer of 13½ cents an hour. The corporation also stated it was unwilling to include a maintenance of membership provision in any new contract which may be signed with the union.

Wartime Steel Control Is Revived in Canada

TORONTO, ONT.

Canada is facing a serious shortage of steel as a result of the steel strike in the United States and to cope with the situation on this side of the border, wartime steel control has been re-established with Martin A. Hoey of Montreal, former assistant steel controller, in charge. Following a meeting of the new Steel Control Board it was announced that Algoma Steel Corp., Sault Ste. Marie, Ont., will increase steel production by 10,000 tons per month, and also step up output of pig iron by 10,000 tons monthly. In addition arrangements have been made whereby the Dominion Steel & Coal Co., Sydney, N. S., will ship 4000 tons of billets per month to Montreal to be converted into bars and other steel shapes.

Shortage of steel is slowing down the automotive assembly and parts plants, which were just recovering from a plague of other shortages and strikes. Shown above is the Mercury production line which had reached an output of 200 units per day. Last week Ford was forced to lay off 40,000 workers due to shortage of steel. NEA photo

Strike May Idle 500,000 in Michigan

DETROIT

CREEPING paralysis is changing to galloping strangulation in the automotive and parts industries in the face of continuing shortage of steel and pig iron. Automobile assembly lines, just getting started again after delays in other materials, are once more halting, Ford having laid off 40,000, Packard 8000 to name only two.

The Michigan Manufacturers Association estimates 500,000 will be idle throughout the state by Feb. 20 if the strike continues.

Automotive & Aviation Parts Manufacturers Association figures 200,000 will be thrown out of work throughout its member plants around the country in a matter of weeks.

Henry Ford II, president of Ford Motor Co., last week wired Reconversion Director Snyder that his company will have to shut down completely unless steel is made available promptly to the company and its suppliers. It is understood that between 85,000 and 90,000 production employees will be affected if the Ford plants close. Office and salaried workers will not be affected.

In his telegram Ford made a plea for immediate removal of price controls on all matters connected with the manufacturing of automobiles and parts. He said that at current OPA ceilings the Ford company is losing about $300 on every car produced.

Parts suppliers are not exhausting their steel stocks.

Closing of steel plants has shut off supplies of pig iron to foundries, few of which had as much as 30 days' inventory of metal. A few scattered sources are still shipping, but cuts in foundry production schedules have been necessary to stretch out inventories. One plant has cut back by 50 per cent and estimates it will be able to continue operation until March 1 with supplies on hand.

No break has yet appeared in the form of a return to work in fabricating plants holding steelworkers' union contracts, despite the President's statement that union members in such plants should resume work where no disputes with managements exist. It is becoming clear these plants will have to negotiate new contracts embodying wage increases granted by Big Steel.

The UAW-CIO has made a new demand on General Motors that the corporation pass along to all salaried em-

ployees raises equivalent to those ultimately given hourly rated personnel. GM has already given 10 per cent raises to salaried employees.

Cincinnati Consumers' Inventories Are Low

CINCINNATI

Paralysis will come quickly to the metalworking industries in Cincinnati area as a consequence of shortage of steel.

The strike proper, in 23 plants, sent 11,600 workers from their jobs.

First shutdown, due to lack of sheets, was in the F. H. Lawson Co., manufacturers of cabinets, cans, buckets, and other metal goods. The shutdown affected 450 employees. At the other extreme, is the large Crosley plant which could continue through all of February.

A survey indicated steel inventories, when the strike started, averaged not more than three weeks.

Should the strike last two more weeks, 35,000 workers in 100 factories here will be forced to quit production.

Gradual stagnation will hit other plants, dependent in part on steel products.

Machine tool manufacturers have supplies of castings, and are getting more, but their steel stocks are generally short. Warehouse stocks of wanted items are dwindling rapidly,

Consumers Readjust Work Schedules

CHICAGO

CONFIDENCE that the steel strike will be settled within the next few days operated last week to make consumers in this district look upon their rapidly shrinking inventories with less trepidation than might have been expected. Fact remains, however, that steel is running short in many plants, and numerous work schedules will have to be readjusted or curtailed almost immediately, for replenishment will be slow even after mills resume.

Overall, steel on hand in consumers' plants averages about 30 days. Some items exceed this, others fall far short; consequently, it is the latter that will hold up fabrication and assembly of many finished products. For some manufacturers, a deficiency of electrical components resulting from the strike in the electrical industry retards production as much as lack of steel.

Within coming weeks, many manufacturing plants will be shortening the hours of workmen to adjust operations to material supply. A few plants which have been maintaining 48-hour weeks are dropping to 40 hours, or less in certain departments. Others which since V-J Day have adopted 40-hour weeks are arranging to go substantially below this level. Management seems determined to provide maximum work for the maximum number of people, so that scaling down wherever the situation requires is more likely to be the policy rather than one of completely closing down plants. It is not possible to estimate loss of employment which may result.

A few important warehouses in this district are out of operation because their workers are members of the steelworkers' union. Those which are not affected report a heavy pressure for steel, some coming from consumers not previously served as customers. By limiting quantities, and selecting customers with discretion as to urgency of need, stocks are being conserved.

New York Area Operations Reduced

NEW YORK

SECOND week of the steel strike brought further reduction in metalworking operations in this district. However, the decline has resulted more from a reduction in the operating rates of various companies rather than from complete suspensions. Most plants at the beginning of the walkout had an average of close to 30 days' supply of steel on hand, but even where they had this much steel there is a disposition to conserve inventories by reducing working schedules.

At the same time a number of plants had closed down, either as a result of a strike directly affecting their own organizations or because of inadequate inventory. One of the larger plants scheduled to go down shortly unless the steel strike is settled meanwhile, is the Edgewater, N. J., property of the Ford Motor Co., employing 2800 production workers. A few days ago this plant was reported by its officials as having less than a week's supply of steel on hand.

Running somewhat counter to the general trend, or at least holding its own a little better than most metalworking branches, is the foundry industry. This is ascribed primarily to the fact that early in the week seven gray iron foundries in Brooklyn, which had been closed down since early in January as a result of a wage dispute with American Federation of Labor, have resumed. Also one of eight CIO foundries in the imme-

Railroad Embargoes Halt Shipments

PHILADELPHIA

INGOT production in the Central Eastern Seaboard District continues to hover around 4 per cent. Meanwhile, pig iron production is being restricted to the output of one stack.

So far there have been few if any important disturbances as a result of picketing, although at some plants, including a couple of steel plants, tension is increasing as a result of union efforts to organize office workers.

Railroad embargoes have been clamped on shipments to some plants, including steel consuming as well as steel producing plants; however, embargoes in this district, it is understood, have not yet developed to the extent reported in certain inland areas. Also, while at certain points a number of cars are being tied up, the overall picture in this respect is not as bad as traffic authorities anticipated at the time the steel strike was called.

Considerable speculation exists as to how long it will take steel producers to get into production once the end of the strike has been called. Some trade leaders believe that it will be at least a week before rolled steel starts moving in any substantial volume and even longer before it gets back to pre-strike levels.

Most metalworking shops in this district that did not go down almost immediately after the steel strike was called are continuing to operate, although at a reduced scale. According to some authorities, another week or ten days, without any resumption in the flow of steel, will witness the closing down of a few hundred establishments, including, of course, a large number of small organizations.

Threat of one important suspension was removed in the past week when RCA-Victor, Camden, N. J., employing several thousand workers, adjusted its differences with its employees before a walkout took place. Meanwhile, the largest steel consumer out of operation in this district continues to be the Baldwin Locomotive Works, which employs approximately 12,000 workers.

diate Newark, N. J., district down as a result of the CIO strike, has resumed operations as a result of a wage dispute settlement. However, raw material inventories are getting low and another week or so, should the steel strike continue that long, will see a more severe decline in the melt.

Structural fabricating operations in this district are declining more appreciably, as various shops, employing AFL labor, are forced to curtail because of dwindling supplies.

Pittsburgh Counts 126,000 Idle Due to Steel Strike

PITTSBURGH

To date no metalworking plant in this area has had to close down due to shortage of steel. However, if the steel strike is not terminated this week, some plants will have to reduce operations below 40 hours per week and a few may have to shut down.

Some fabricators' operations have been retarded by inability of suppliers to ship component parts, while others have received hold-up orders from their prime contractors. Others have reduced operations to conserve inventories.

At the start of the steel strike metalworking companies' inventories averaged about 30 days' supply at production pace then in effect.

Only effect of the steel strike on employment in those industries here not directly under USA-CIO contracts is that 13,000 workers have been thrown out of work in coal mines, rail and river transportation, and similar industries directly connected with steel production. Number of those workers so far affected by the steel strike here totals 126,000. This includes steel producing, metal fabricating, transportation and mining industries.

However, the major blow to employment is expected within the next two weeks should the steel strike continue, affecting literally thousands of metalworking companies.

Curtailments in Cleveland Slower Than Anticipated

CLEVELAND

Industrial operations in this district have been curtailed as a result of the stoppage in the flow of steel from the mills but the slowdown has been more gradual than had been expected.

In the first two weeks of the strike, freight shipments dropped over 25 per cent from the weekly average of 420,000 tons and are expected to drop 40 per cent by the end of this week.

Although some large plants have been closed, others have been able to make necessary adjustments to maintain production at a fairly steady level. This has been accomplished in some cases by shifting work from orders for which raw material supplies have been exhausted to orders for which limited supplies are still available; in others, by uncovering supplies which have been overlooked in previous inventory checks.

30,000 Unemployed in South; All Mills Down

BIRMINGHAM

Minus any steel production whatsoever, the Birmingham district counted a loss of approximately $1,500,000 in wages alone as the result of the initial week of the steel strike. Unemployment has reached an estimated 30,000 in the district and already small inventories of metalworking industries are becoming alarmingly low with slowing down evident in several plants.

Suspensions by Consumers Expected at Youngstown

YOUNGSTOWN

Those Youngstown fabricating plants which have not been closed by the strike may be forced to shut down within the next week or two by lack of steel.

None of the fabricators has large stocks of steel on hand.

A suspension of most of these plants for lack of steel would throw another 4000 or 5000 workers out of employment.

Meanwhile steel output here is at a complete standstill.

An estimated 75,000 to 85,000 are idle here due to strike of steelworkers and electrical workers. About 1500 to 2000 are railroaders; roads here have furloughed many men and laid up hundreds of locomotives because 75 to 80 per cent of local business is from steel plants.

Pacific Norhtwest Plants Down; Building Delayed

SEATTLE

The strike of steel workers has completely stopped production in this area. Both local rolling mills are closed indefinitely.

This situation has aggravated the scarcity of building materials; many construction projects have been postponed until the steel market is adjusted.

Expect Heavy Pressure for Steel When Strike Ends

BOSTON

Pressure for steel deliveries will be extremely heavy when mills resume production after the strike. Fabricators who have been operating on inventory have sharply reduced stocks and in some cases have reduced operations to stretch out remaining supplies. Fabricators forced to close down directly by the strike will be in a somewhat more favorable position after the strike ends, in that they will have the same inventories as they had when the stoppage began.

Supplies Flown to Strike-Bound Mill

BUFFALO

PRINCIPAL interest in the walkout of 33,000 steel workers in approximately 40 area plants is centered on the "air war" between the union and the Bethlehem Steel Co. over the landing of about 50 plane loads of emergency food and maintenance items at the strike-bound Lackawanna mill.

With the union maintaining strong picket lines 24 hours a day because the company refused to permit the union to dictate the procedure for allowing necessary personnel through the picket lines, the mill took to the air. Daily landings have been reported for more than a week. Union representatives succeeded in getting the identification numbers of some planes and protested to the Civil Aeronautics Authority asking that the planes be grounded because they were violating the 1000-foot minimum altitude level. The CAA investigated and found no violations and Bethlehem continued to either land planes or have planes fly over the sprawling properties and drop supplies. It is estimated that about 600 workers, including General Manager Edward F. Entwisle are in the plant which shut down Jan. 11 when workers jumped the gun on the nationwide strike. The mill has 11,000 out.

So far, lack of steel supplies has had no appreciable effect on manufacturing plants, but curtailment in operations is expected this week. In addition, many plants turning out finished products are already idle because they are covered by USA contracts.

Unless the steel strike is settled, the local Ford plant is expected to start paring output the early part of the week.

Industrial Production in December Held Close to High November Rate

Output of consumer durable goods rose despite increasing labor-management differences, civilian production administrator reports, but was below earlier expectations. Steel needs call for average output of 86 per cent in 1946

DESPITE the increasing volume of labor-management differences, industrial production during December continued close to the high November rate. This was revealed in the December report on civilian production issued last week by John D. Small, civilian production administrator.

Production of finished goods, such as refrigerators and washing machines, increased over November but was far short of earlier expectations.

"We are in a sellers market of unprecedented magnitude," Mr. Small said. "Thus the inflationary pressures and tendencies of the current situation are much greater than those which existed in 1918. . .If we are to withstand the severe inflationary pressures now in evidence throughout the economy, price controls must be continued. Such controls, however, must be used realistically and flexibly to bring about the most rapid possible increase in production to meet reconversion requirements."

86 Per Cent Steel Rate Needed

Reviewing the critical materials and components supply situation, Mr. Small said steel production must average 86 per cent of capacity in 1946 if the 61 million product tons needed to meet the projected demands of steel-consuming industries are to be produced. Certain steel products, such as sheet and strip in certain gages, will be particularly tight. Other products which may cause concern in the months ahead are: Hot-rolled bars, structural shapes, tin plate, and wire and wire products. CPA is now considering what it need do when the strike is over in order to facilitate the rapid and equitable resumption of activity in the steel-using industries.

Unfilled orders for gray iron castings total nearly 2½ million tons, or more than three months' production while those of malleable iron castings are nearly 450,000 tons, or about seven months' production.

There must be further increases in the supply of pig iron to satisfy the expanding demand for foundry products.

Due to shortages of electrical sheet steel and coating materials for magnet wire, there was a threatened shortage of fractional horsepower motors to provide for high level production in 1946 even before the electrical workers strike. Increased facilities for producing electrical sheet are scheduled for completion late in 1946 and substitute materials are expected to be made available for coating magnet wire.

The continuing short supply of lead is expected to keep storage battery production for replacement use at low levels. Expanded new automobile production and high seasonal requirements later in 1946 are expected to face a stringently allocated lead supply at that time.

Estimated shipments of consumer durable goods in December and percentage increases over the November totals were, respectively, as follows: Vacuum cleaners, 90,000 and 10; electric irons, 350,000 and 14, refrigerators, 150,000 and 30; electric ranges, 30,000 and 12; domestic washing machines and ironers, 65,000 and 9;alarm clocks, 900,000 and 36; domestic radios, 100,000 and nearly 100.

Shipments of warm air furnaces in November and December are estimated at about 60,000 units compared with 40,000 units in October. Production of residential oil burners rose steadily in 1945, reaching 16,000 units in October, a rise of 40 per cent over September. Passenger car output was 30,022 units in December compared with 34,612 in November while commercial truck output of 28,039 units in December was the lowest since August.

Present, Past and Pending

■ CHICAGO MADE BASING POINT FOR TUBING SALES

PITTSBURGH—National Tube Co., subsidiary of U. S. Steel Corp., last week announced establishment of Chicago as a basing point for the sale of carbon and alloy seamless mechanical tubing and carbon and alloy seamless heat exchanger and condenser tubes. Prices quoted will be the same as on the Pittsburgh base.

■ CPA RESTRICTS SHIPMENTS OF TIN PLATE

WASHINGTON—Civilian Production Administration has prohibited export of tin plate and has restricted domestic shipments of tin plate to companies other than those specifying that it will be used in manufacture of closures and containers for packaging of seasonable or perishable foodstuffs, pharmaceuticals, and biologicals. Prohibition of export of steel, other than castings and forgings, tool steel and electric furnace steel, is pending.

■ ALABAMA POWER TO SPEND $8 MILLION FOR CONSTRUCTION

BIRMINGHAM—Contingent upon ability to get materials and equipment, Alabama Power Co. this year will spend more than $8 million for construction, including 3200 miles of new rural electric lines.

■ STEEL INVENTORY RESTRICTIONS TIGHTENED

WASHINGTON—Direction 9 to priorities regulation 13, issued last week, prohibits acceptance of delivery of: Hot or cold-rolled carbon steel sheet, 14-gage and lighter; flat galvanized sheet and strip; electrical silicon sheet; tin plate; or wire and cable; by any person buying for use on a special sale under PR 13, if his inventory will result in more than 45-days' needs.

■ URANIUM OUTPUT COST ESTIMATED AT $100,000 A POUND

NEW YORK—Probable manufacturing cost of uranium 235 and plutonium, essential components of the atomic bomb, is estimated at $100,000 a pound, according to unofficial estimates in public utility circles here. On basis of heat provided, comparable cost of coal at $6 a ton is set at $7200.

■ METALS RESERVE TO RESUME FOREIGN COPPER PURCHASES

WASHINGTON—Office of Metals Reserve plans to buy 20,000 tons of foreign copper a month during the first half of 1946. Purchases had been discontinued last October.

■ SIX MILLION POUNDS OF SURPLUS ALUMINUM SHEET SOLD

BUFFALO—About 6 million pounds of government-owned aluminum sheet at the Curtiss-Wright Corp.'s plant here has been sold to the Rochester Iron & Metal Co., Rochester, N. Y., for about $1,200,000, or about 59 per cent of the original cost.

Steel Earnings Reports Support Producers' Position on Wages

Income drop shown by few companies reporting to date for 1945. U. S. Steel's net fails to cover dividend payments. Suggested wage boost would raise costs $100 million, almost double corporation's profit for all of 1945

STEEL company earnings for fourth quarter and all of last year, now coming out, are bearing out industry claims that large wage increases cannot be granted without corresponding sharp increases in ceiling steel prices.

Few reports have yet been issued, but the December statement of the U. S. Steel Corp. last week was accepted generally as substantiating the industry's wage-price position. In this connection, U. S. Steel has been carrying the ball in current wage negotiations.

Earnings of U. S. Steel in fourth quarter, after all costs, including taxes, amounted to $13,267,300, or $1,740,872 less than the dividends declared for the period. Third quarter earnings were $11,624,420, while the corporation reported net of $10,985,624 in the fourth quarter of 1944.

Income for the full year 1945 was $57,045,093, or $2,987,592 less than the dividends declared for the year, and it was $3,746,188 less than earnings reported for 1944.

More than a $4 per ton steel price increase will be required to cover an 18½-cent per hour wage boost suggested by President Truman as a compromise settlement in the steel strike, Irving S. Olds, chairman, U. S. Steel, indicated last week at a press conference following the quarterly meeting of the corporation directors.

Mr. Olds estimated that the cost to U. S. Steel of a wage increase of 15 cents an hour (offered by the corporation), including the resultant higher cost of purchased goods and services would be $80 million a year. For a wage increase of 18½ cents an hour he estimated that the corporation's costs would be increased $100 million a year, and he pointed out that on the basis of an annual production of 16 million tons of finished steel, approximately 80 per cent of the corporation's present capacity, either a wage increase of 15 cents or 18½ cents would require a very much larger steel price increase than the $4 per ton which has been suggested as proposed by government stabilization authorities.

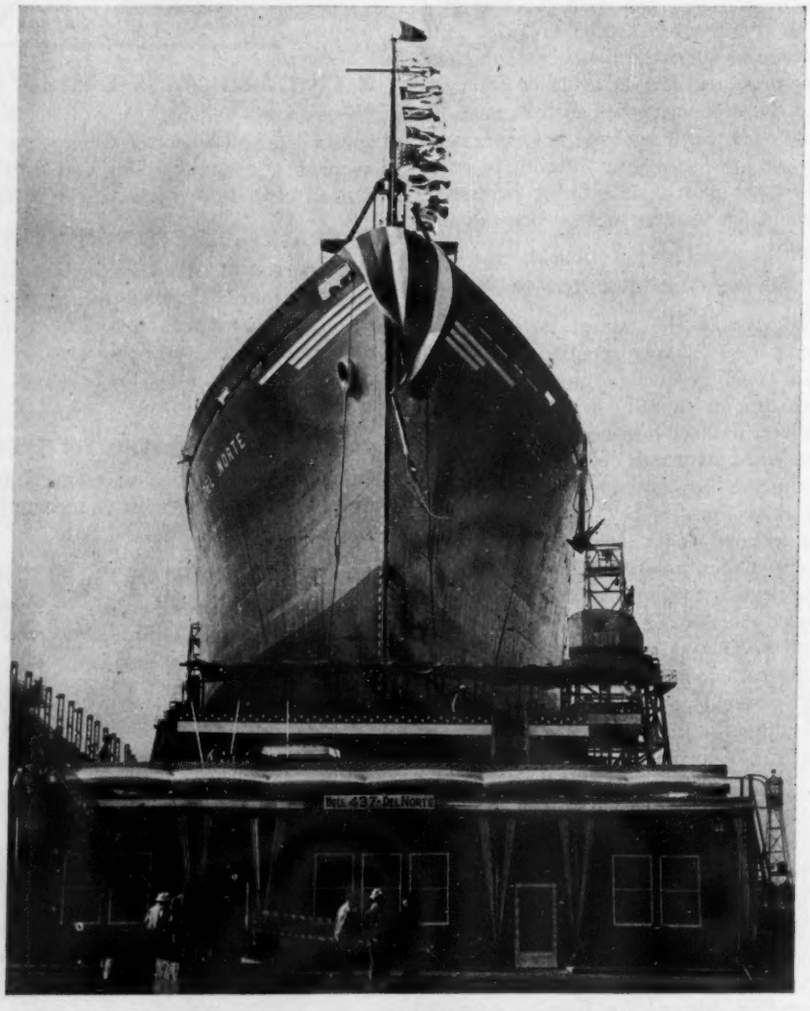
Mr. Olds statement that an increase of 18½ cents per hour in wages would raise the corporation's costs by $100 million a year was interpreted by trade observers to mean that in order to grant such a wage boost the corporation would have to get a price increase of at least $6.25 per ton. However, this is not the case, Mr. Olds said later in the week commenting as follows:

"The statement which I released to the press yesterday (Jan. 29) has been erroneously interpreted in some news stories as indicating that a steel price increase of $6.25 per ton would permit us to grant a wage increase of 18½ cents an hour.

"What I did say was that a wage increase of 18½ cents an hour would by itself increase our costs to the extent of $100 million a year. Apparently the figure of $6.25 a ton has been arrived at by dividing this sum of $100 million by an assumed annual production by us of 16 million tons of steel.

"But a price increase of $6.25 a ton would include nothing for past heavy increases in our costs. In my statement yesterday I pointed out what has been emphasized by us on numerous occasions in the past, namely, that we are already entitled by law to price increases by reason of past heavy increases in our costs quite apart from any present wage increase. The right to such price increases has heretofore been admitted to us informally by government officials.

"If due consideration is given to these



POSTWAR LUXURY LINER: Featuring war-developed navigational aids, the 17,000-ton Del Norte is the first luxury liner to be completed in the United States since the war. It was built by Ingalls Shipbuilding Corp.

past heavy increases in our costs a price increase greatly in excess of $6.25 a ton is necessary to enable us to grant a wage increase of 18½ cents an hour."

In a prepared statement issued at the press conference, Mr. Olds said that the fundamental question is whether "it is wise and in the public interest artificially to force up price levels for a basic product such as steel for the purpose of paying a wage to steelworkers beyond the point for which there is a sound justification."

He indicated there has been nothing formal or definite as to what price increases would be granted under a given set of conditions, and declared he did not know whether the price increase, when and if it came, would be "straight across the board" or not, although he inferred that was what Washington had in mind.

Mr. Olds emphasized that a general wage increase by U. S. Steel is not possible without increases in ceiling prices, pointing out that steel prices today are substantially at prewar levels although labor and other costs have gone up enormously since 1940.

Referring to higher costs of purchased goods and services which would result from a wage increase, he said that estimates were based on experience, for every increase of 1 per cent in wages, the corporation having found that before long it had to pay two-thirds of 1 per cent more for purchased goods and services.

Shipments of finished steel by the corporation in fourth quarter amounted to 4,096,568 net tons, compared with 5,286,322 net tons in the fourth quarter of 1944. Subject to yearend adjustments, 1945 shipments totaled 18,484,277 net tons, decrease of 2,567,902 from 1944.

Production of steel ingots and castings in all of 1945 averaged 82 per cent of the corporation's rated capacity, while ingot production averaged 72 per cent in fourth quarter.

Net current assets of the corporation and its subsidiaries on Dec. 31, 1945, after deducting current dividend declarations, were $602,509,355, compared with $552,460,609 on Dec. 31, 1944.

Total capital expenditures during the twelve months of 1945 for additions to and betterments of fixed assets were approximately $36,900,000.

$11,447,858 Earned by Bethlehem in 4th Quarter

Net income of Bethlehem Steel Corp. for the quarter ended Dec. 31, 1945, was $11,447,858, after charges and taxes. This compares with $16,379,398 in the December quarter of 1944. Net income for the third quarter of 1945, including a $34,980,000 income tax credit, was $7,761,667.

For the year 1945, net income was $34,947,116, against $36,167,723 in 1944. Last year's earnings were equal to $9.52 a common share, while those for 1944 were equal to $9.93 a common share.

Directors declared a dividend of $1.50 a common share, the same amount paid in previous quarters recently.

Inland Steel Reports 1945 Net Income Decline

Inland Steel Co., Chicago, reports for the year 1945, before final audit, net profit of $9,861,210, which compares with 1944 earnings of $10,249,395.

Net income of the company for 1945 includes $1,099,491 reserve no longer required. Charges for 1945 not made in 1944 include $534,215 premium paid and expenses on bonds called for redemption; $1,040,000 payment to Inland Steel Co. pension trust; $651,813 net amortization of emergency facilities applicable to years prior to 1945; and $600,000 settlement of patent claims.

Keystone Steel & Wire Co. Reports Rise in Earnings

Keystone Steel & Wire Co., Peoria, Ill., last week reported an increase in net profit in fourth quarter of 1945 over third quarter and also over the fourth quarter of 1944.

Net profit in the fourth quarter of 1945 was $537,329 after all charges including federal income taxes. This compares with net profit of $285,139 in the third quarter of 1945 and $481,003 for the fourth quarter of 1944.

For the six months ended Dec. 31, 1945, net profit was $822,468, compared with $787,454 in the corresponding period of 1944. The company's fiscal year ends on June 30.

Lukens Steel Sustains Loss In Last Quarter of 1945

Lukens Steel Co. and subsidiaries, Coatesville, Pa., in the last quarter of 1945 sustained net loss of $448,278, before estimated tax recoveries, compared with net profit of $83,993 in the corresponding period of the previous year.

After estimated tax recoveries of $291,350 a net loss of $156,928 was charged against earned surplus for the last quarter of 1945. That period was the first quarter of the company's 1946 fiscal year.

Six Months Loss Reported By Colorado Fuel & Iron

Colorado Fuel & Iron Corp., Denver, and subsidiaries report for the six months ended Dec. 31, subject to yearend adjustments, net loss of $410,018 after provision for amortization of emergency facilities. This compares with net profit of $1,036,186 in the like period of 1944.

In the December quarter the company reports loss of $452,214 compared with net profit of $611,710 in the like quarter of 1944.

Wheeling Steel's 1945 Net Profit Shows Decline

Preliminary report of Wheeling Steel Corp., Wheeling, W. Va., and subsidiaries for the year ended Dec. 31, 1945, shows net profits of $3,950,252, equivalent to $3.75 a share on common stock after preferred dividends. In 1944 net profits were $4,384,789 or $4.51 a common share.

Pig Iron Output Increases in December

Pig iron production in December totaled 4,322,996 net tons, compared with 4,025,958 tons in November, bringing the total for the year to 54,167,082 tons, against 62,866,198 tons for the year 1944, according to figures reported to the American Iron & Steel Institute, New York.

The December total included 35,613 tons of ferromanganese and spiegeleisen, these alloys totaling 712,210 tons for the year. During 1945 the pig iron industry operated at 80.5 per cent of capacity, compared with 91.7 per cent in 1944. December operations were at 75.8 per cent of capacity. Comparisons by districts are presented in the following tabulation, in net tons:

			Total		
	Pig Iron	Ferro, Spiegel	December	Year to Date	Per Cent Capacity
Eastern	741,373	15,649	757,022	9,980,254	76.8
Pittsburgh-Youngstown	1,767,677	14,040	1,781,717	21,689,186	83.7
Cleveland-Detroit	436,370	.....	436,370	5,462,690	82.9
Chicago	921,457	...	921,457	11,510,810	81.8
Southern	300,008	5,924	305,932	3,881,664	78.8
Western	120,498	.....	120,498	1,642,478	57.9
Total	4,287,383	35,613	4,322,996	54,167,082	80.5

Government Realizes 39 Per Cent Return on Capital Goods Disposals

Capital and producers' goods and aircraft having reported cost of $511,320,000 were sold for $200,639,000 through 1945, leaving inventory on hand of $5,683,069,000 at the year end. Total surplus property inventory exceeds $10 billion

DISPOSALS of surplus capital and producers' goods and aircraft through last year show a return to the government of 39 per cent of cost, the War Assets Corp., subsidiary of the Reconstruction Finance Corp., the disposal agency designated by the Surplus Property Administration for such property, announced last week.

Property having a reported cost of $511,320,000 was sold for $200,639,000. Disposals of industrial plants and industrial real estate are not included in these totals. As of Dec. 31, 231 government-owned war plants had been sold or leased or put into civilian operation through short-term leases with their wartime lessee. These plants represent a government investment of about $1,070,681,000.

Machine Tool Sales Big

Sales of machine tools topped other groups of capital and producers' goods by a wide margin, receipts from these sales totaling $53,903,000 compared with reported cost of $96,223,000 or a 56 per cent return. Sales prices and costs of the main items in this group were, respectively, as follows: Lathes, $14,204,000 and $26,980,000; grinding machines, $6,038,000 and $12,647,000; boring machines, $3,815,000 and $7,801,000.

Second most important in volume of sales is the steel group, products costing $32,365,000 being sold for $18,155,000, or 55 per cent of cost. Sales of steel bars that cost $7,444,000 returned $3,015,000; rolled plates that cost $4,491,000 had a sales price of $2,939,000 and wire (except barbed, twisted, rope, etc.) that cost $2,692,000 sold for $2,021,000.

Sales price and reported costs, respectively, of other capital and producers' goods by groups follow: Chemicals, $4,897,000 and $8,113,000; nonferrous metals, $5,409,000 and $9,936,000; fabricated metal basic products, such as storage tanks, rubber-insulated copper wire, pipe fittings, except iron, $2,534,000 and $6,028,000; general purpose industrial machinery equipment, such as internal combustion engines, compressors, pumps, cranes, etc., $6,112,000 and $13,277,000; electrical machinery, such as generator set units, motors, transformers, etc., $4,399,000 and $9,246,000; special industrial machinery, such as sewing machinery, melting furnaces, and other foundry equipment, $3,582,000 and $10,004,000.

Metalworking machinery (except machine tools), $9,545,000 and $21,491,000; communication and electronic equipment (including communication wire and cable, insulated wire and cable, radio tubes, glass only), $3,532,000 and $8,653,000; all other capital and producers' goods, $46,903,000 and $71,297,000.

As of Dec. 31, aircraft parts with a reported cost of $8,729,000 had been sold for $3,761,000 and aircraft that cost $215,458,000 had been sold for $37,907,000.

As of Dec. 31, inventory of surplus capital and producers' goods, aircraft and aircraft parts (not including plants) amounted to $5,683,069,000. Nonsalable aircraft accounted for $3,550,010,000, or about two-thirds of the total. The remainder available for disposal consisted of $1,101,627,000 capital and producers' goods, $457,588,000 salable aircraft, $573,844,000 aircraft parts.

Largest capital and producers' goods holdings are in machine tools, the reported cost being $295,889,000. Metalworking machinery, except machine tools, account for $121,641,000; communication and electronic equipment, $190,179,000; steel, $115,784,000; special industrial machinery, $23,562,000; electrical machinery and apparatus, $56,374,000; general purpose industrial machinery and equipment, $66,347,000; fabricated metal basic products, $38,320,000; nonferrous metals, $57,504,000; and chemicals, $50,871,000.

Government-owned property originally costing $1,660,829,000 was declared surplus in December, bringing total declarations of surplus property up to the end of 1945 to $12,431,040,000. Of the total of property declared surplus, $4,643,660,000, or 37 per cent, was aircraft considered probably not salable while other property accounted for the balance. All disposals through Dec. 31 totaled $1,245,189,000, exclusive of nonsalable aircraft, which amounted to $1,093,650,000.

December disposals (excluding nonsalable aircraft) continued the steady rise begun in mid-1945, reaching a total of $274,130,000, as compared with $180,925,000 for November. This rise was chiefly owing to increases in disposals of plants and industrial real property. Consumer goods disposals declined from $51,307,000 (reported cost) in November to $45,778,000 in December. In December, consumer goods reported to have cost $44,092,000 were sold for $17,396,000, as compared with November totals of $48,052,000 and $16,266,000, respectively.

The original cost of all surplus property, other than nonsalable aircraft, sold through December was $1,219,966,000, and cumulative proceeds through the same month totaled $611,024,000. Abandonments, donations, and transfers without reimbursement account for disposals not included in sales, and totaled $25,223,000 through 1945.

The entire surplus inventory at the end of last year totaled $10,092,201,000.

Integrated Steel Plant at South Chicago Offered for Sale, Lease by War Assets Corp.

STEEL plant at South Chicago, Ill., which is now being operated by Republic Steel Corp. under an interim lease agreement running from month to month, is offered by War Assets Corp. for purchase or lease. Proposals must be delivered no later than Monday, April 1, to the office of the president, WAC, 811 Vermont Ave., N. W., Washington 25.

Proposals to purchase may be on the basis of all cash or credit terms. Proposals to lease may include options to purchase upon reasonable terms at any time prior to two years preceding termination of the lease.

The plant was built to increase carbon and alloy steel production and shortly will be declared surplus to government needs. It is an integrated steel plant on a site of about 160 acres. Facilities include a storage yard for iron ore, limestone and coal; coal handling equipment; coke and by-product plants; blast furnace; four 200-ton open-hearth tilting and three 70-ton electric furnaces, completed, and six 70-ton electric furnaces, almost completed; one 44-inch blooming mill; one 32-36 inch bar mill; a complete metallurgical and testing laboratory, and all other utility and auxiliary facilities necessary for operation of the plant.

War Drain on Minerals Found "Staggering"

Increased exploration for new reserves and stockpiling of scarce metals recommended by Ickes

INCREASED exploration for new reserves of metals and other minerals and stockpiling of scarce metals is recommended by Secretary of Interior Harold L. Ickes in his annual report to the President.

Terming the war's drain on our natural resources "staggering," Mr. Ickes advocated the importation and storing of metals which are in short supply in this country.

"Only nine of the major minerals—iron ore, nitrogen, magnesium, salt, bituminous coal, phosphate rock, molybdenum, anthracite and potash—remain in our known domestic reserves in great enough quantity of usable grade to last 100 years or more. Our known usable reserves of 22 essential minerals have dwindled to a 35-year supply or less."

Mr. Ickes warned that assured domestic "reserves of petroleum would last from 14 to 20 years at the present rate of use. However, he said that prospects for making good on some of our war losses are "fairly hopeful."

Included in the list of 22 essential minerals which are in limited supply are manganese, vanadium, tungsten (all needed in the production of high-grade steels), petroleum, copper, lead, tin, zinc, nickel, bauxite, chromite, cadmium, cobalt and coking coal.

Alloying Materials Short

The report indicated present supplies of manganese are expected to be exhausted within two years, those of vanadium within seven years and those of tungsten within four years.

Minerals for manufacturing military weapons and equipment and the fuel to power them together with civilian requirements during the war years cost the United States $36 billion. This was about six times a normal peacetime year's consumption and 20 per cent of the total value of all minerals and fuels produced in the 65 years from 1880 to 1945.

Metals produced during the war years were valued at $11 billion; fuels at $20.7 billion; and other nonmetallic minerals at $4.8 billion.

NEW MINERAL BOOM: Reminiscent of the Klondike gold rush on a smaller scale is a boom now underway at Val D'Or in western Quebec where recently discovered deposits of gold, silver, copper and zinc are being exploited. With five producing mines, others in the process of development and hundreds of "prospects", the town's population has increased from five prospectors ten years ago to 7500 at present. Town boosters have adopted as a motto "Come to Val D'Or for your first million." Shown above are miners working a night shift in a mine more than 1000 feet below the surface. NEA photo

The war hurried along the depletion of mineral resources and in some cases the "cream" of the high-grade deposits is gone, the report said. For this reason, the department's Bureau of Mines believes the use of marginal mineral deposits must be emphasized and improved techniques found to utilize the lower-grade minerals.

Statistics by the Bureau of Mines for 1945 show total production of minerals and mineral products for the year amounted to $8,067,000,000, a decrease of 4.6 per cent from 1944. The decline was due to a decrease in the output of metals.

The drop in production of metallic products was due chiefly to a reduction in demand, especially for steel, labor shortages at the mines, restrictions in gold production, depleted ore reserves, and in some cases, inadequate price incentives. The value of metallic products declined from $2,340,000,000 in 1944 to $1,890,000,000 in 1945.

In addition to lower steel production in 1945, the bureau reported the output of gold, silver, copper, lead, zinc, iron ore, aluminum, magnesium, manganese ore, tungsten, mercury and molybdenum was substantially lower.

Find New Iron Deposits In Northwest Adirondacks

Ten areas of intense magnetic attraction, indicative of deposits of magnetic iron ore, have been discovered in the northwest Adirondacks, according to a report by W. E. Wrather, director of the Geological Survey. Only one of the areas out of the ten showed any indication of having been prospected previously for iron ore. The remaining nine represent new discoveries.

Patent Office Carrying Heaviest Load in History; 150,000 Pending

Commissioner notes stronger disposition on the part of business men to put patents to work. Twelve thousand listed in register as available for licensing. Demand for "soft copies" from manufacturers at home and from foreign countries increases

CONFRONTED with the heaviest load in its 156-year existence, the Patent Office is having a nip-and-tuck struggle in adjusting itself to the needs of the reconversion period. It has been able to step up its service in some directions but these gains are accompanied by losses of ground in others. The big difficulty of the Patent Office is a shortage of experienced help. The bad feature is that the deficiency cannot be remedied at once, for the Patent Office is a government bureau and must be managed under government rules. The appropriation request for the fiscal year 1946-1947 was prepared and acted on by the Bureau of the Budget last year and now is up for early action by the Congress. Hence there can be no authority for recruiting the needed personnel until the fiscal year 1947-1948.

Until then there will be increasing delays in action on patent applications.

"We now have more than 150,000 patents pending," Commissioner Casper W. Ooms told STEEL. "We expect to receive about 100,000 applications this year. We should have 1000 examiners to handle this load. Actually we have some 400 examiners—compared with about 500 at the start of the war. On the average, an examiner can dispose of about 100 cases a year.

Sees Backlog of 200,000

"Barring unexpected developments, this means that our backlog of patents pending will have grown to over 200,000 by the end of 1946."

Some relief can be expected later this year, for the 1946-1947 budget request now before Congress calls for an increase in the number of examiners to 550. Mr. Ooms hopes that the additional people will be attracted as a result of liberalizing the rules covering promotions in the Patent Office, and permitting the hiring of new people at higher starting pay than before. Under these changes junior examiners can be raised quickly from the starting pay of $2320 up to $2980, again to $3640, and finally $4300. These rates, incidentally, are due to be scaled upward when Congress, as is expected sometime this year, moves up salaries of government employees in proportion to the rise in the cost of living.

In one important detail the Patent Office has made a big improvement in its service. Last year, when Mr. Ooms assumed his office, it took two to five months on the average, to service orders for "soft copies" of patents. Now it takes

CASPER W. OOMS

24 hours to service over-the-counter sales, about three days to fill mail orders accompanied by cash, and up to three weeks to fill charge-account orders. The soft copies are printed copies on thin paper which sell at 10 cents, and Mr. Ooms estimates that sales during the present fiscal year will aggregate about 6,000,000 copies. This is an increase from about 5,000,000 in the 1944-1945 fiscal year and is due to the great interest since the war in finding new products to manufacture.

In addition to the domestic demand, there has been a big demand for soft copies from foreign countries eager to obtain data on newly patented United States products. Several hundred thousands of copies have been bought by the U. S. S. R. alone in recent months.

One of the worries at the Patent Office is the present impossibility of classifying "the almost unmanageable literature of disclosures that is daily mounting in inconceivable volume," according to Mr. Ooms. Whereas 15 professional people now are engaged in such work, 100 would be required to do the job thoroughly.

For instance, there are no facilities at present for classifying information published in trade and technical publications. All this information, says Mr. Ooms, is essential to prevent unpatentable subject matter from ripening into a patent. Radio patents, for example, he says, have not been classified for 20 years. An important feature of the 1947-1948 budget request, therefore, will be the request for authority to enlarge the classifying staff sufficiently.

But this matter of classifying information disclosing prior art is only a detail toward the objective of issuing better patents in the future than in the past, Mr. Ooms says. The Supreme Court, he recalls, has thrown out all patents that have come before it in the past 20 years. He now is busy on two projects intended to bring about issuance of better patents in the future. One is a revision of Patent Office rules to fit modern conditions. The other is the creation of a review committee which will look at every patent before it finally is issued. The purpose, to put it another way, is to sharpen the process of determining whether invention is or is not present.

Code of Rules Desired

Another project which Mr. Ooms has in mind is establishment of some degree of agreement between Patent Office examiners, the Patent Office Board of Appeals, and the federal courts, on rules to determine the presence or absence of invention. "This result could be brought about in time," he believes, "by a co-operative attitude. We in the Patent Office would strive to adopt the rules formulated by the courts, and we would hope the courts would adopt our rules. Thus, in the course of time, a generally accepted code of rules might emerge, and reduce the amount of confusion that characterizes patent litigation."

Mr. Ooms also advocates a move over which the Patent Office has no authority, but which has been suggested to him by his previous experience as a patent attorney. Patent litigation now is most difficult work for the federal courts as the system now functions. Mr. Ooms favors the enactment of a law which would provide for the trial of patent cases before technically competent judges or judges aided by impartial technical experts. Appointment of judges equipped with specialized knowledge,

The CONE AUTOMATIC MACHINE COMPANY

sees many

GOOD THINGS AHEAD

Photo Courtesy Pantex Pressing Machine, Inc.

It is reported that . . . . . .

One of the country's largest corporations announces that it will build a million-dollar plant for the making of prefabricated houses. Plans call for the starting of production about the middle of 1946, and capacity will be 1650 per year. *U. S. Steel Corp.*

get ready with CONE for tomorrow

A large chemical company promises to build a million-and-a-half dollar plant for the production of synthetic caffeine. The raw materials will be air and water. *Monsanto Chemical Co.*

get ready with CONE for tomorrow

During the war, the principle of mass production was applied to the making of marine chronometers, increasing the output from 400 a year to thousands. *Hamilton Watch Company.*

get ready with CONE for tomorrow

One of our leading technical colleges is planning to establish a gas turbine research laboratory which will include a supersonic wind tunnel and special facilities for the study of compressors, combustion devices, jets and other gas turbine elements. *M.I.T.*

get ready with CONE for tomorrow

Indication of industry's increasing use of the multiple spindle automatic is the recent announcement of the new five-spindle machine built by Warner & Swasey.

get ready with CONE for tomorrow

In a new radio-phonograph set the radio unit can be readily removed and used separately. *Westinghouse.*

get ready with CONE for tomorrow

A new mechanical cotton picker is designed to take advantage of the recently developed method of defoliating the plant by means of a chemical spray. *Charles R. Berry, Vicksburg, Miss.*

get ready with CONE for tomorrow

An optical company announces the development of a light-polarizing glass. Previous polarizers have been made of natural crystals or plastic film. *American Optical Co.*

PRODUCTION TIME = $\frac{\textit{CYCLE TIME}}{4}$

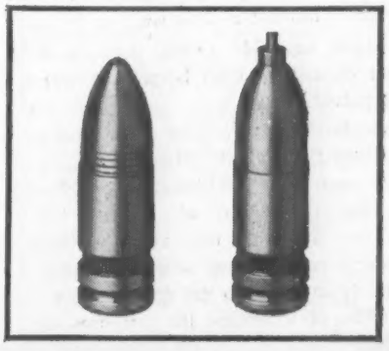
on the Vertical Conomatic

The Vertical Conomatic job shown here consists of a second operation where all four spindles are hopper-fed. A single operator produces 6,500 pieces per eight-hour shift — an average work cycle of 14 seconds—an average part production of 3½ seconds!

Although Vertical Conomatics can produce *4 like parts* during every cycle, they can be used to advantage for producing *dissimilar parts* during each cycle, within certain dimensional limitations.*

It will pay you to investigate the possibilities of the Vertical Conomatic on your own work. Write for details.

*** Consult Cone for particulars.**



CONE

AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U. S. A.

he believes, would speed up patent litigation and result in better decisions.

Also, on the basis of his experience in the field of patent law, Mr. Ooms sees the need for a pooling of patents in various industries in the future, so that many companies may embark on production programs that are needed to balance the economy. Such pooling will be required in complex fields like radar, radio, television, plastics, light metal fabrication, atomic energy, etc. It will not only have to be accomplished by negotiation between the interested companies, but by government co-operation. It is to be hoped, Mr. Ooms feels, that legislation for this purpose will be enacted in the near future.

Mr. Ooms heartily favors a proposal which provides, following an interval sufficient to secure the inventor against piracy of his invention, for publication of applications. "Such publication," says Mr. Ooms, "would be for the purpose of soliciting the exposure of any anticipation that may have escaped the Patent Office. It would have the added benefit that the publication would speed the disclosure to the public and thus enable those who wish to work around the invention or improve upon it to begin without awaiting the issuance of the patent."

Register Proves Valuable

Experience with the Register of Patents Available, which was inaugurated at the Patent Office in June of 1945 has been gratifying, says Mr. Ooms. The International Harvester Co. has listed some 1200 of its patents as being available for licensing. The Radio Corp. of America has listed several thousands of patents—in fact, all it owns—for the same purpose. There are some 12,000 patents listed altogether. The Patent Office publicizes the listings and seeks to stimulate interest in licenses.

All signs, says Mr. Ooms, indicate a stronger disposition than before the war to put patents to work.

"More business men," he told STEEL, "come into the Patent Office nowadays to talk over their problems. These include the disposition of patents for which they have no use; also the disposition of patents they now are taking out merely in order to get on the record their dates of invention for purposes of defense."

Mr. Ooms wants to encourage invention by reaching inventors at the grass-roots level. He now is having some literature prepared, including a booklet telling the inventor how he may proceed to obtain patent protection. The Patent Office will also issue a list of registered patent attorneys. Copies of these booklets are to be placed in post-offices all over the United States where the "little fellow" can pick them up and read them at his leisure.

Cost of the Patent Office to the taxpayers is surprisingly small, considering the services it renders. "It is costing the taxpayers about $700,000 a year," says Mr. Ooms. "The office earned $4,146,000 in the fiscal year 1945 and spent $4,888,000. In the present fiscal year through November it earned $1,685,000 and spent $1,994,000."

OPRD Transferred from CPA To Commerce Department

Office of Production Research & Development has been transferred from the Civilian Production Administration to the Department of Commerce. Unliquidated war research and development contracts entered into by OPRD prior to the date of the order, Jan. 3, will not be transferred but will continue under the jurisdiction of CPA until liquidated. OPRD is formulating plans to advance postwar industrial research and development within the Department of Commerce.

OPA Revises Automotive Parts Pricing Provisions

Special wartime provisions which manufacturers may use in pricing new automotive parts produced in newly constructed plants are to be terminated, the Office of Price Administration has announced.

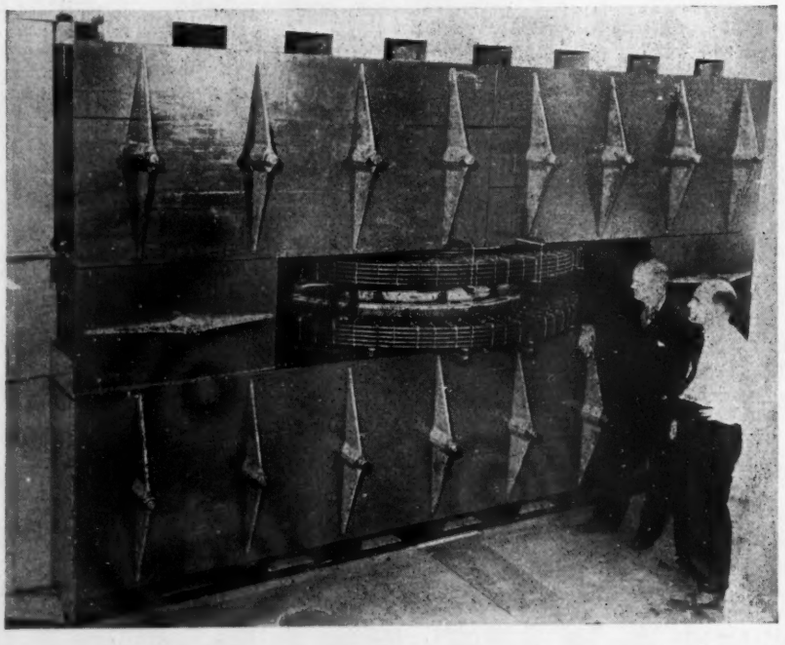
Beginning March 25, builders of new plants for the production of automotive parts will be required to use their March 31, 1942, costs for labor and materials, rather than the more liberal provisions now in effect, in calculating their ceiling prices.

At present a builder of a new parts plant may use as a base date for pricing purposes the date upon which price quotations were first made from the new plant or upon which production was started in the plant, whichever was earlier.

H. C. Rose Named Director, Contract Settlement Office

H. Chapman Rose has been named director, Office of Contract Settlement, effective Feb. 1, succeeding Robert H. Hinckley. Mr. Rose was formerly deputy director of the office and has been with that office since its organization in 1944. He previously served as secretary to the Joint Contract Termination Board under John M. Hancock.

Mr. Hinckley has returned to private business as vice president and director of the American Broadcasting Co., New York.



POWERFUL X-RAY: Dr. E. E. Charlton, left, head of the X-ray section of the General Electric Co. laboratory at Schenectady, N. Y., and W. E. Westendorp, an associate, examine the company's new 100,000,000-volt X-ray machine, which scientists believe holds important possibilities in the treatment of such diseases as cancer. NEA photo

Partial List of Approved Dealers for Surplus Machinery

Botwinik Bros. Inc., P. O. Box 1960, New Haven 9, Conn.
Reynolds Machinery Co., 303 Eddy St., Providence, R. I.
Lyman A. Smith Machinery, 410 Asylum St., Hartford, Conn.
MacKenzie Machinery Co., 36 Oliver St., Boston.
Hazard Brownell, 350 Waterman St., Providence, R. I.
Austin-Hastings Co. Inc., 226 Binney St., Cambridge, Mass.
Stedfast & Roulston Inc., 156 Oliver St., Boston.
United Machinery & Tool Corp., 35 Herman St., Worcester, Mass.
Alfred L. Brown Associates Inc., 4 Cherry St., Worcester, Mass.
Triplex Machine Co., 117 Fourth St., Pittsfield, Mass.
H. Leach Machinery Co., 387 Charles St., Providence, R. I.
Botwinik Brothers of Mass. Inc., 2 Sherman St., Worcester, Mass.
Machineshop Equipment Co., 170 Summer St., Boston.
Harold Co., 137 Oliver St., Boston.
E. M. Noel Co., 71 Newbury St., Boston.
Nutmeg State Machinery Corp., 1041 State St., New Haven, Conn.
Daley & Sibley, 417 Chapel St., New Haven, Conn.
Wigglesworth Machinery Co., 199 Bent St., Cambridge, Mass.
Textile Mill Supply Co., 1300 S. Mint St., Charlotte, N. C.
George M. Bernstein & Co., 12-18 S. Clinton St., Chicago.
Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago.
Mandel & Smithson Machinery Co., 712 Washington Blvd., Chicago.
C. B. Burns Machinery Co., 541 W. Washington Blvd., Chicago.
Earle Hart Woodworking Machine Co., 565 W. Washington Blvd., Chicago.
Miller Equipment Buyer, 409 Jefferson St., Ft. Wayne, Ind.
Bengtson Inc., 208 S. LaSalle St., Chicago.
Engineering Sales, Madison Road, R.R. No. 2, Anderson, Ind.
Hill-Clarke Machinery Co., 649 W. Washington Blvd., Chicago.
William A. Stone, 218 N. Canal St., Chicago.
Neff Kohlbusch & Bissell, 2400 W. Madison St., Chicago.
Indianapolis Machinery & Supply Co. Inc., 1959 S. Meridian St., Indianapolis.
Richmond Machinery Equipment Co., 106 N. Desplaines St., Chicago.
E. Cohn & Sons Inc., Cedar Rapids, Iowa.
Robert W. Rice & Co., 110 N. Desplaines St., Chicago.
P. P. Wagener, 1714 Walnut Ave., Wilmette, Ill.
W. L. Steege Machinery Co., 25 S. Jefferson St., Chicago.
Luther & Pedersen Inc., 565 W. Washington Blvd., Chicago.
Adams Machinery Co., 114 S. Clinton St., Chicago.
Purdy Co., 122 S. Michigan Ave., Chicago.
Prescott Production Tool Co., 1200 N. Ashland Ave., Chicago.
Barron Machinery Co., 32 N. Clinton St., Chicago.
H. W. Industries, 5665 W. Lake St., Chicago.
Hosdreg Industries Inc., Huntington, Ind.
Universal Machinery Co., 613 W. Washington Blvd., Chicago.
Machinery & Electric Motors Co., 817 W. Lake St., Chicago.
Hood Machinery Co., Yorktown, Ind.
Winston Machinery Corp. Inc., 1102 Burdsal Pky., Indianapolis.
Joseph Behr & Sons Inc., 1126 Seminary St., Rockford, Ill.
Matson Machinery Sales, 610 W. Michigan St., Milwaukee.
Scully Machinery & Equipment Corp., 77 W. Washington St., Chicago.
Franklin Supply Co., 600 S. Michigan Ave., Chicago.
Root Bros. Mfg. & Supply Co., 10307 S. Michigan Ave., Chicago.
Consumers Machinery Exchange Inc., 146 W. Root St., Chicago.
E. L. Easley Machinery Co., 825 W. Evergreen Ave., Chicago.
Nichol Machinery Co. Inc., 637 N. 7th St., Milwaukee.
Marshall & Huschart Machinery Co., 628 Chamber of Commerce Bldg., Indianapolis.
Harris Supply Co., 809 Madison St., Chicago.
Cook County Machinery Co., 1034 West Lake St., Chicago.
Malco Machinery Co., 745 W. Van Buren St., Chicago.
H. J. Weber & Co., 549 W. Washington Blvd., Chicago.
State Machinery Co. Inc., 31 E. Georgia St., Indianapolis.
F. Mayer, 608 S. Dearborn St., Chicago.
Ira C. Jordan, 2508 E. Belleview Pl., Milwaukee.
H. H. Pelz Machinery Co., 627 W. Washington Blvd., Chicago.
M. J. Schmitt Machine Tools, 7006 W. Greenfield Ave., West Allis, Wis.
L. L. Richards Machinery Co., 529 S. 2nd St., Milwaukee.
Marshall & Huschart Machinery Co., 571 W. Washington Blvd., Chicago.
Ashland Machinery Co., 565 W. Washington Blvd., Chicago.
Davis Machinery Co., 126 N. Clinton St., Chicago.
Giddings & Lewis Machine Tool Co., Fond du Lac, Wisc.
David C. Pyke, 221 Transportation Bldg., Indianapolis.
H. F. Wolnick Machinery Co., 9 S. Clinton St., Chicago.
Gisholt Machine Co., 1245 E. Washington Ave., Madison, Wis.
Walter F. Stegner Co., 20 N. Wacker Drive, Chicago.
John H. Sipchen Co., 549 W. Washington Blvd., Chicago.
Clinton Supply Co., 110 S. Clinton St., Chicago.
Pagel Machinery Co., 1641 S. 24th St., Milwaukee.
Interstate Machinery Co. Inc., 1431 W. Pershing Road, Chicago.
Fry Machinery Sales Co., 14 N. Clinton St., Chicago.
A-C Supply Co., 249 N. Water St., Milwaukee.
Walter H. Meyer Machinery Co., 250 Farmers Trust Bldg., Ft. Wayne, Ind.
Moser Machinery Co., 1530 W. National Ave., Milwaukee.
Homer B. Johnson Co., 549 W. Washington, Chicago.
Clinton Machinery Co., 32 S. Clinton St., Chicago.
Donahue Steel Products Co., 1919 W. 74th St., Chicago.
Federal Machinery Sales Corp., 9 S. Clinton St., Chicago.
Victor Machinery Co., 130 S. Clinton St., Chicago.
Kirby Risk Electric Co., 302 Ferry St., Lafayette, Ind.
Briggs-Weaver Machinery Co., 309 N. Market St., Dallas 2, Texas.
Long Machine, Tool & Die Co., 2801 Elm St., Dallas, Texas.
Bert Tolbert Machinery Co., 505 W. Weatherford St., Ft. Worth, Texas.
Hamilton Huster Machinery Co., 1109 Patterson Ave., Dallas, Texas.
Margett Electric Co. Inc., 1811 N. Harwood St., Dallas, Texas.
Perry Machinery Co., 409 S. Akard St., Dallas, Texas.
Mims Equipment Service, 3404 Ross Ave., Dallas, Texas.
C. R. Brown Jr., 1914 Moser St., Dallas, Texas.
Bill Lindsley Machinery Co., 3001 Elm St., Dallas, Texas.
C. J. Harter Machinery, 1401 Gulf States Bldg., Dallas 1, Texas.
P. D. Browne Co., Irwin-Keasler Bldg., Dallas, Texas.
Overton & Ross Co., 2703 Main Street, Dallas, Texas.
Veterans Projects Corp., 313 First Nat. Bk. Bldg., Denver.
Kenyon Iron Works, 1400 Delgany St., Denver.
Mine & Smelter Supply Co., 17th & Blake Sts., Denver.
F. J. Leonard Co., 514 18th St., Denver.
Hendrie & Bolthoff Mfg. & Supply Co., 1635 17th St., Denver.
John D. Howarth & Co., 3135 E. Jefferson Ave., Detroit.
William F. Scott Machinery Co., 12416 Flanders, Detroit.
Addy & Luby Machinery Co., 8316 Woodward Ave., Detroit.
Walter F. Rooney, 1322 Horton Road, Jackson, Mich.
Prussian Machinery Co., 1475 E. Grand Blvd., Detroit.
Holzbaugh Machinery Sales, 10905 Charlevoix, Detroit.
E. A. Krueger Co., 1010 Kirk St., Saginaw, Mich.
Given Machinery Co., 3855 Santa Fe Ave., Los Angeles.
C. S. Morris Machinery Co., 1023 Santa Fe Ave., Los Angeles.
Machinery Sales Co., 3838 Santa Fe Ave., Los Angeles.
Harry King, 2328 Santa Fe Ave., Los Angeles.
SM Equipment Co., 5531 S. Vermont Ave., Los Angeles.
Moore Machinery Co., 3876 Santa Fe Ave., Los Angeles.
Harron, Rickard & McCone Co. of Southern California, 3850 Santa Fe Ave., Los Angeles.
J. F. Owens Machinery Co., 1804 Erie Blvd., E. Syracuse 1, N. Y.
Morris Machinery Co. Inc., 99-115 Chestnut St., Newark, N. J.
Buffalo Machinery Co. Inc., 833 Grant St., Buffalo.
Morey Machinery Co. Inc., 410 Broome St., New York.
F. W. Schiefer Machinery Co., 514 E. & B. Bldg., 39 State St., Rochester, N. Y.
Don W. Patterson Co., 2012 Rand Bldg., Buffalo.
Ganey Machinery Co., 1807 Elmwood Ave., Buffalo.
John S. Johnston, 141 Broadway, Rm. 1113, New York.
J. L. Lucas & Son Inc., Fairfield, Conn.
Giebel Inc., 250 W. 57th St. and 152 Temple St., New Haven, Conn.
Eveready Electric & Supply Co., 805 Housatonic Ave., Bridgeport, Conn.
Grace & Way, Slingerlands, N. Y.
O'Dowd & McNichol, 277 Broadway, New York.
Hull-Engineering Co., 90 Grove St., New York.
R. L. Crane Machinery Co., 296 Delaware Ave., Buffalo 2.
Alex Zeeve & Co., 2271 Woolworth Bldg., New York.
Wm. Halpern & Co., 53 Park Place, New York.
M. A. Newman, 1662 Chapel St., New Haven, Conn.
Noble Machinery Co. Inc., 217 Centre St., New York.
J. L. Osgood Machinery & Tool Co., 48 Pearl St., Buffalo.
Robert E. Joy & Co., 165 Broadway, New York.
Dewelsaw Machinery & Tool Corp., 423 Ninth Ave., New York.
M. P. Gooley Machinery & Tools, P. O. Box 324, 811 Audubon Parkway, Syracuse, N. Y.

British Coal and Coking Firms Plan Expansion

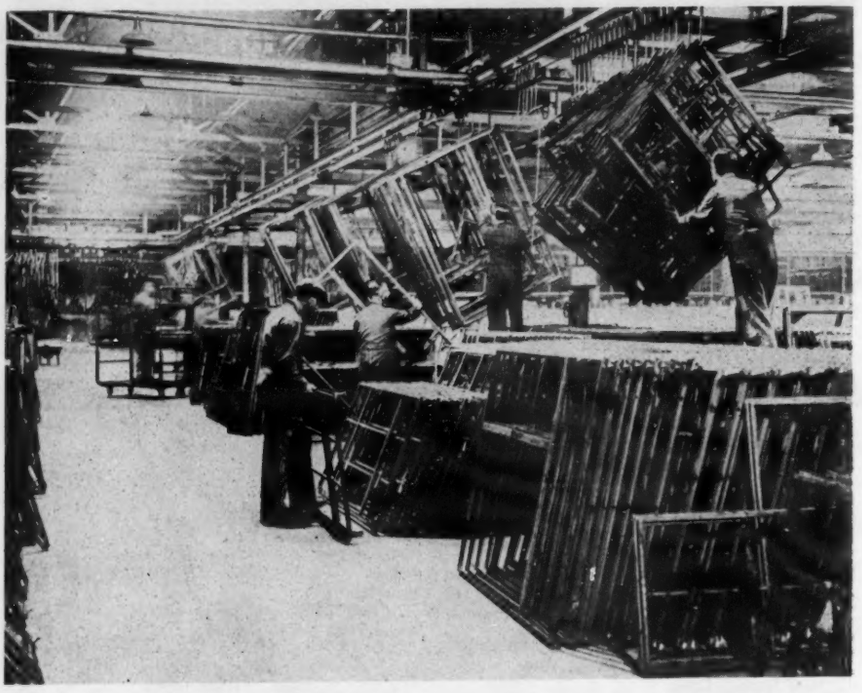
Output of coal-tar derivatives and coke-oven by-products will be increased if necessary coal can be obtained

IF THE necessary coal can be obtained, British production of coal-tar derivatives and coke-oven by-products is expected to increase, according to a report to the U. S. Department of Commerce.

The iron and steel industry's modernization program calls for the building of a number of new coking installations, with special attention to by-product recovery and treatment; and several coal and coking companies are engaged in improvement and expansion projects.

Coal shortages have prevented some companies from increasing production. One firm reports that 17 of its 59 new or reconstructed ovens cannot be put into operation because of the lack of coal, while another large concern states that it cannot obtain as much coal as it can process and that during the war it could have distilled 2 million tons more if it had been available.

This second company has been particularly interested in the development of finished products designed to meet specific needs and plans to spend up to £100,000 in this work. Products included in its low-temperature carbonization program include a solvent for synthetic rubber, a material for use in reclaiming rubber, an alternative for bitumen in the manufacture of linoleum, bonding material for colored mastic floors, synthetic bitumen for road surfacing, cresylic creosote for preserving wood, and substantial amounts of high-boiling acids.



Metal windows for Britain's postwar houses, prefabricated and constructed on site, are being turned out in quantity at the Witham, Essex, works of the Crittall Mfg. Co. Scarcity of labor and raw materials keeps the company from reaching capacity production of 7400 windows a week. Photo shows workmen hanging window frames on a conveyor to be carried to an automatic paint dip.
NEA photo

France Places U. S. Orders For 27,250 Freight Cars

In dire need of rolling stock with which to revitalize its economy, France has turned to American enterprise to put its railroads in operation and, as the first step to this end, has placed the largest postwar order yet made for railroad equipment by any foreign government with American Car & Foundry Co., New York.

Placed through the Railway Purchasing Commission of the French Supply Council to the United States, the order is for 8750 box cars and 4000 gondolas, according to Charles J. Hardy, chairman, and F. A. Stevenson, president, American Car & Foundry.

Other orders placed are with Pressed Steel Car Co. Inc., Pittsburgh, for 4500 twenty-ton four-wheel boxcars, and with Pullman-Standard Car Mfg. Co., Chicago, for 10,000 similar boxcars.

Plans for Costa Rican Power Plant Hit Snag

Plans for construction of a new 7500 kilowatthour hydroelectric plant in Costa Rica have struck a snag in the form of the proffered contract, which contains features that may not be acceptable to the contracting company, according to an official report from San Jose. The contract, it was said, fails to amend the existing foreign exchange law which would prohibit the company from obtaining dollars to pay interest and dividends on bonds and stocks now held in the United States.

England Expects To Export Plows and Cultivators

Anticipated development of the British agricultural engineering industry will not only provide for domestic needs of plows and cultivators, but will leave a substantial surplus for export, according to a report to the Department of Commerce. It was also pointed out that sufficient spare parts will be available for track-laying tractors and other agricultural machinery imported from the United States to meet home needs. A proposal is under study at London to send a group of British agriculturalists to Germany to study recent developments in design and production methods in that country, and to select machines to be sent to England for trial use.

FOREIGN NOTES . . .

Turkey offers a market for tractors, binders, reapers, drills, plows and other farm machinery. The machines are primarily needed for cultivating the sizable state farms, although some large private operators also can use such equipment. Purchases of farm machinery are under control of a government agency.

—o—

Plans for a much larger textile capacity have been reported from Turkey. Equipment from other parts of the country may be assembled in a new plant to be built at Halkabunar, near Imir. This plant will have a capacity of 40,000 spindles and 1200 looms, compared with 30,000 spindles and 1000 looms for the present plant.

—o—

Central electric stations in Canada had an output for the first 9 months of 1945 totaling 30,274,210,000 kwh, of

which hydraulic plants furnished 29,597,805,000 kwh.

—o—

A joint national and state government project in New South Wales and Victoria, Australia, has been proposed to develop a hydroelectric plan for the Snowy river in those states. The project would involve about £30 million, shared jointly. The development would include a power station to generate 200,000 kilowatts.

—o—

Soviet Russia is believed to now have in operation an additional blast furnace, which has been constructed during 1945 at the Alpaevsk metallurgical plant, U.S.S.R. Last reported by American authorities as nearing completion in October, it was scheduled by the Soviet authorities to go into operation in November.

—o—

An English government plant is reported to be preparing to manufacture hard fiber machinery, to employ approximately 800 people.

—o—

Part of Russia's fourth "5-year plan" will comprise development of iron ore deposits in Bashkiria, which were recently discovered. They will be exploited by a government metallurgical combine, according to unofficial advices to this country.

Additional German Plants Available for Allocation

A second list of 29 individual industrial plants which have been declared available for allocation on the German reparation account by the Allied Control Council was issued last week by the State Department and the Office of International Trade, Department of Commerce.

The list of plants follows: Wolf & Co. at Bomlitz, Liebenau and Doorverden, propellants; Dynamite A. G. at Duneburg, propellants, and at Kurmmel, explosives; Warren Commission A. G., Denneberg Elbe, explosives and safety fuses; Clausthal, Clausthal-Sellerfeld, explosives; Heeres Munitions Anstalt at Ahrbergen, Dodenteich, Lehre, Grasleben, Lockledten-Lager, Godenauber Lafeld, and Scheuen, ammunition and shell filling; Hans Moog, Wuppertal-Ronsdorf, pyrotechnic filling of flares; Slaswerk Riedel underground factory, Burgdorf, mortar bomb filling; Sperrwaffe Arsenal, Soltan, marine mine filling; Fulbanlage Clauen, Clauen, heavy shell filling; Lufthaupt Munitions Anstalt at Hamburen and Nienberg-Weser, munitions; I. G. Uerdingen, Uerdingen, electrolytic chlorine; Chemische Werke Harz-Weber, Langelsheim, activated carbon for gas masks, Mauser Werke, Vohringen, flame-throwers; Suddeutsche Dornierwerke, Friedrichshaven (Manzel), airplanes and airplane parts and speed boats, and at Konstanz, airplane parts and wing assembly; Obering O. Stellman, Manzel (Wurttemburg), airplane parts; Arguswerke, at Dusslingen, bearings, at Bromach, metal armatures, and at Ptullendorf, airplane brakes.

U. S. Furnishes Bulk of Australian Tin Plate Needs

Virtually the entire volume of Australian imports of tin plate and sheet steel for the year ended June 30, 1945, were of United States origin. Total imports of tin plate and sheet steel amounted to 2,663,743 cwt, valued at £3,903,000. Of the total, United States shipments represented 2,499,903 cwt, valued at £3,686,000. Other sources furnished the following: United Kingdom, 135,866 cwt, £232,000; Canada, 27,256 cwt, £44,000; and 718 cwt, £1000, from New Zealand.

Improperly Documented Exports May Be Seized

Exporters were reminded recently by the Department of Commerce that, while trade has been restored to a limited extent with all areas except Japan and Germany, shipments not covered by import documents where required may be subject to seizure upon arrival in the country of destination.

This and other requirements current in the trade situation over the world are set forth in the departmental bulletin No. 304 on exports, defining conditions under which applications are accepted for consideration to export commodities to areas where trade has been restored.

New Iron Ore Deposits in Canada Mapped

Areas in western Labrador and northern Quebec believed capable of yielding over 200,000 tons per vertical foot

LARGE iron ore deposits are reported in western Labrador and northern Quebec by survey parties which explored the regions last summer, according to reports now being completed.

The surveys covered areas that are estimated to be capable of yielding more than 200,000 tons per vertical foot. Some deposits were reported to be one to two miles long, up to 1000 feet wide, and possibly extending thousands of feet in depth.

The average of drill cores showed the iron running 68.421 per cent; phosphorus, 0.0098 per cent; sulphur, 0.038 per cent; and silica, 1.426 per cent.

It was estimated that it would cost possibly $100 million to build a railroad from these deposits to the St. Lawrence river.

Shortage of Manpower Checks English Razor Output

English straight-razor manufacturers are reported by the Department of Commerce as having an improved supply of steel and other materials, but are handicapped in filling orders for lack of skilled workers. Many of the skilled workers have not returned to their old jobs after being released from the Army or war work, it is reported.

Mexican Federal Electricity Commission Expanding Service to Urban Districts

IN AN aggressive program to provide electric service to large communities, and even smaller towns, the Mexican Federal Electricity Commission is reported to have under way some 19 projects, with a survey in progress to determine the needs of the smaller communities in that country.

The extension of electric and telephone service to rural areas is reported encountering certain handicaps, as a result of which foreign-owned power companies have abandoned in the past several years any attempt to develop paying service loads in areas adjacent to the large communities.

Among the factors are scattered populations, relatively low purchasing power in the rural sections, and the laws which put a burden on the customer when more than 164 feet of line is involved. All power companies are reported so overburdened they are reluctant to add any new customers.

Customers are factory-built too!

How will the customers be created whose money will be needed to keep your plant going at profitable levels?

Not by selling and advertising alone — nor by new gadgets or finer appearance or promises of better performance.

If wages and distribution costs are to remain high, the only way you can keep prices low enough to create new customers (without affecting profits) is to increase production . . . lowering costs, attracting greater quantity and frequency of buying, making new jobs, giving business an adequate return on investment.

The Bullard Company, Bridgeport 2, Connecticut.

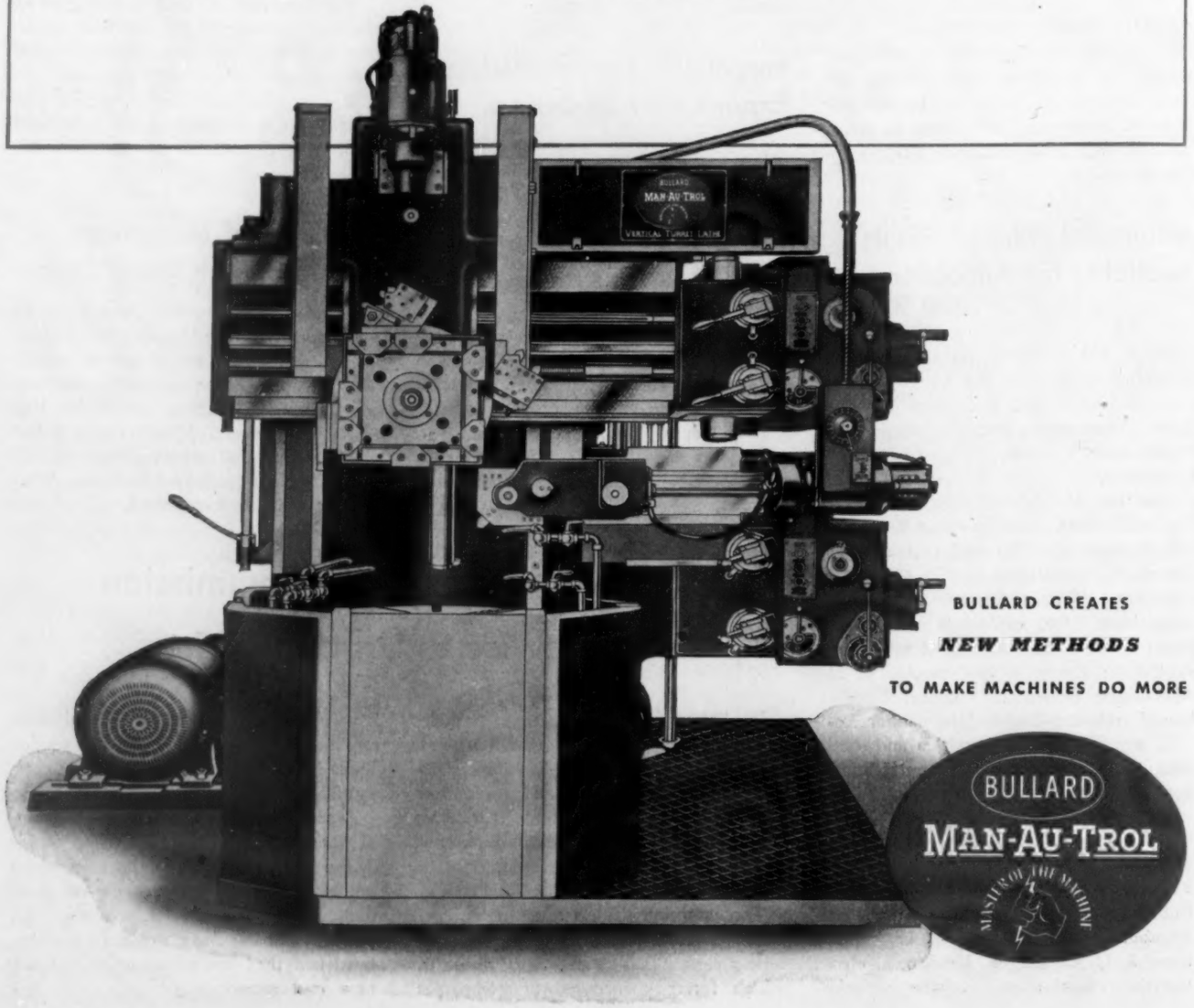
for example: SEE HOW THE BULLARD MAN-AU-TROL VERTICAL TURRET LATHE LOWERS UNIT PRODUCTION COSTS

LIGHTENS LABOR'S LOAD — Operator machines one piece manually, setting production method into automatic cycle; then merely loads, supervises and unloads while MAN-AU-TROL does the work.

MAKES AUTOMATICITY VERSATILE — Automatically handles any work within manually-operated scope of Vertical Turret Lathe. Converts instantly to manual operation on same or entirely different piece without affecting automatic cycle.

SAVES SET-UP TIME — Set-up time from one class of work to another is only slightly more than for a manually-operated machine.

REDUCES SALVAGE COST — Machines day after day with consistent accuracy not obtained under manual operation.



BULLARD CREATES
NEW METHODS
TO MAKE MACHINES DO MORE

BULLARD
MAN-AU-TROL
MASTER OF THE MACHINE

mirrors of MOTORDOM

By A. H. ALLEN *Detroit Editor, STEEL*

Ford and Chrysler wage agreements increase pressure for settlement of disputes in General Motors and steel industry. Chrysler increase to cost $24 million annually. Ford payroll to be raised by $40 million; salaried personnel to get 15 per cent increase

DETROIT

SUDDEN Saturday afternoon race between Ford and Chrysler to be the first to announce wage agreements with the UAW-CIO, won by the former with a margin of two hours and 35 minutes, was a curious and unexpected development in the face of continued stalemates in steel and General Motors. Net effect was to throw additional pressure on the two strikebound industries for an early end to their disputes, and there is good possibility that by the time this appears in print the ten-week GM strike may be over and a wage agreement concluded somewhere near the 18 cents-an-hour figure. Once this is accomplished a settlement in steel would appear imminent.

The conciliatory tone of statements issued following conclusion of the Ford and Chrysler negotiations was reassuring, Chrysler and the UAW declaring, for example, "In their collective bargaining resulting in the agreement, both the company and the union made concessions that both sides believe will improve employee-management relations, better the procedures for handling grievances and raise productivity."

Chrysler Agreement Comprehensive

And further, "It (the contract) recognizes the interests of both the union and management in peaceful settlement of differences through collective bargaining and also in high productivity in building cars and trucks of outstanding quality. Now that war conditions in the plants have passed, it is our mutual desire that prewar productivity be restored and the union and company have pledged themselves to co-operate to this end." The Chrysler agreement, incidentally, covered all points in a complete contract, while the Ford settlement covered initially only the matter of wages.

Parenthetically, Norman Matthews, union negotiator in the Chrysler dealings, at least paid lip service to his striking confreres at General Motors by saying, "In coming to the agreement, the union bore in mind the plight of the GM strikers, who have been doing valiantly."

Actually, whether you like it or not, GM has beeen carrying the ball for a large section of the automotive industry and the longer the GM strike wore on the more tractable has become union labor, not only in the large automotive plants, but in scores of parts and material suppliers' plants as well. For about the first month of the strike, union members in other plants were inclined to strut, later they became a little more subdued, and in recent weeks their attitude has been, "Well, let's negotiate, we don't want any strike in this plant." So against a 10-15 per cent loss of annual production in GM plants can be balanced a noticeable clearing of the atmosphere in union-management negotiations generally.

Settlement of the costly GM strike devolved largely into a matter of personalities. Many disinterested observers were convinced that if the union had someone other than Walter Reuther, and the corporation someone other than Harry Anderson and his staff to negotiate matters, an agreement would have been forthcoming long before this time. The proceedings were involving entirely too much wisecracking, namecalling and smear tactics—on both sides, but particularly from the Reuther camp.

The Chrysler negotiations dated from Aug. 26, and the Ford parleys from Nov. 7, when both companies were presented with union demands for 30 per cent wage boosts. How far the union receded from this inflated demand can be realized from the fact the 18 cents per hour settlement figures to an average of about 15 per cent, raising the Ford average hourly rate from $1.21 to $1.39, the Chrysler rate from $1.14 to $1.325. Minimum wage rate in Detroit area Chrysler plants is boosted from 89 cents to $1.075 cents an hour or a little over 20 per cent, but many hourly rated employees, earning $2 per hour and upward, will receive an increase of less than 10 per cent.

Based on normal production levels (1941) and a payroll of 65,000 including

NEW CROSLEY: This lightweight automobile to be produced by Crosley Corp. will weigh only about 1000 pounds. The engine with all accessories as used in the car weighs only 138 pounds. For details of manufacturing methods, see STEEL, Jan. 21, p. 87

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AID FOR HANDICAPPED: To make automobile driving possible for veterans who have lost limbs, automotive engineers and manufacturers have designed numerous devices. In the one illustrated, upward or downward movement of a single control lever in the driver's hand operates the accelerator, clutch and brakes. Ford Motor Co. supplies these controls free to disabled veterans and they can be installed on any new or used car

salaried and supervisory employees, the Chrysler raise will involve net cost of $24 million per year, while the Ford raise will provide an estimated 120,000 additional wages estimated to cost $40 million annually. Ford meanwhile has announced that all salaried personnel will receive a 15 per cent increase, effective probably at the time of the general increase, a date yet to be determined but likely around Feb. 1. The plan will cover an additional 19,000 employees, including 4335 foremen, who are being transferred from hourly to salaried basis.

These electric breaks in the tense labor situation had administration officials in Washington rubbing their hands in glee, and Secretary of Labor Schwellenbach immediately dispatched an "ace conciliator," James F. Dewey, to Detroit in the effort to crack the GM impasse. Dewey is well known in industry and labor circles here, and over the past ten years has had many hectic and rugged experiences in bringing together strike disputants. Why he was not sent here weeks ago is a mystery to many. Probably the reason is that he has not been associated with the Department of Labor since 1942, the secretary merely "borrowing" him for the occasion.

Encouraging as these labor denouements may be, the overall industrial picture remains stygian in the gloom of the steel strike. Ford terminated assemblies last Friday, with 40,000 laid off, because of scores of interruptions to shipments from suppliers who were closed either because their employees are on strike or because of decision to suspend operations before exhaustion of steel floats. Most suppliers are following the practice of either cutting back or stopping production before "steel in the system" is used up, with the idea that production can be resumed as soon as the steel strike is settled without having to wait for receipt of fresh shipments from mills. One foundry in this area, for example, faced with a tieup of pig iron shipments and having something less than 30 days' inventory, decided to scale back production by 50 per cent and thereby permit continued operation through March 1 on supplies now in hand.

Assembly lines at the Ford Rouge building and in all branch plants will continue to operate as long as their respective floats permit, most having enough inventory or material in transit to permit functioning three or four days this week.

After a suspension of operations over the holiday, Packard resumed about Jan. 10, but was forced to close again Jan. 24 because of a shortage of crankshaft and connecting rod bearings, purchased from the Moraine Products Division of GM. Checks have established the fact supplies of these bearings will not be received until 3-4 weeks after the GM strike is settled, so there is little possibility of Packard being able to account for many assemblies during February. Consequently the Briggs Meldrum plant, supplying Packard bodies, has been instructed to slash schedules for 1946 from 94,000 units to 50,000 units, indicating Packard has cut 44,000 from its 1946 schedules and does not figure this number can be made up by later acceleration before the start of 1947 model production.

Probably most other builders will be effecting similar cuts in 1946 schedules in the face of limping and halted production, making the total output of 1946 models far short of earlier projections. Fisher Body, for example, should have made two more buys of material after the first placed last fall, to keep up with original schedules, but neither has been put through, and probably never will.

Technical Men Sought

A terrific scramble for experienced engineers, draftsmen and layout specialists is under way among nearly all producers, with daily newspaper advertisements being carried by Fisher Body, Ford, Hudson, Chevrolet and others. Shortage of such talent is described as being particularly acute, and prospects for their eventual recruitment none too bright.

Work is being pushed on the Chevrolet light car project, with a staff operating under direction of Arnold Lenz, former assistant Chevrolet manufacturing manager under C. E. Wetherald and now manufacturing manager of the Light Car Division, which has been set up entirely apart from the regular Chevrolet organization.

The Chevrolet light car will be "brand new from the wheels up" and presumably will be built in a new plant in the Cleveland area, although little has been heard of any progress on the plant project since last fall, when start of assemblies was mentioned as at least 18 months away.

THIS VERSATILITY

Also Has Many POSTWAR USES

VICKERS HYDROMOTIVE EQUIPMENT

The myriad requirements of war demonstrated the amazing versatility of Vickers Hydraulic Controls. There were so many kinds of jobs to do—jobs which had to be done better than ever before—jobs which had never previously been accomplished.

For example, in this illustration, the plane has Vickers Hydraulic Control for brakes, automatic pilot and cargo door operation. The lift trucks have Vickers Hydraulic Control which lifts and positions the load accurately at the finger-touch of the operator. The graders building air fields use Vickers Hydraulic Power for steering front and rear wheels, raising, lowering or side shifting the blade, and operating the attachments.

These are just a few of the war jobs Vickers Hydraulics have done. Others include the precision movement of heavy battleship turrets—the automatic aiming of anti-aircraft guns—the fast precision positioning of ammunition hoists—the control of bomber gun turrets—and others which, cannot yet be described.

Many of the intricate machine tools that produced the machines that won the war depended for their accuracy, production speed, and ease of operation upon Vickers Hydraulic Controls.

This demonstration of the remarkable versatility of Vickers Hydraulic Controls suggests many new applications to a wide variety of postwar equipment.

VICKERS *Incorporated* • 1480 OAKMAN BLVD • DETROIT 32, MICH.

Application Engineering Offices:

Chicago • Cincinnati • Cleveland • Detroit • Los Angeles • Newark • Philadelphia • Rochester • Rockford • Tulsa • Worcester

There are more than 5000 Standardized Vickers Units that can be used in various combinations to exactly supply Every Hydraulic Power and Control Function

ANY FEED RATE · ANY TRAVERSE RATE · ANY R P M
ANY SEQUENCE OF MOTIONS · ANY ACCELERATION OR DECELERATION · ANY THRUST . . . . . .

Alcoa Planning To Expand Its Foil Production

Expansion program for three plants will more than double company's current foil manufacturing capacity

ALUMINUM CO. of America, Pittsburgh, plans to expand its foil manufacturing facilities, including installation of equipment at Alcoa, Tenn., the changing of existing facilities at New Kensington, Pa., and increasing of facilities at Edgewater, N. J.

The expansion, which will more than double the company's current foil manufacturing capacity, is expected to be completed the latter part of 1946.

The program, company officials explained, is necessary to keep abreast of increased demands, particularly from the packaging industry in which foil is used for a wide variety of products.

Upson-Walton Co. Foresees Record Volume of Business

Plans for the greatest period of achievement in its history have been formulated by the Upson-Walton Co., Cleveland, which last week observed its 75th anniversary.

As manufacturer of numerous products, including wire rope, tackle blocks, boat fittings, accessories and brattice cloth, the company, according to G. H. Sheldon, president, foresees a volume of production and sales never before approached since the firm was founded. Construction of buildings and highways, and high production rates in industry will contribute to strong demand for the company's products, the firm anticipates.

Rotary Electric Steel Co. Forms Subsidiary

Rotary Electric Steel Co., Detroit, has formed a wholly-owned subsidiary, Stainless Products Inc., which will begin operations in a recently acquired plant at Elizabeth, N. J. N. D. Devlin, president of Rotary, will be chairman of the board of the new subsidiary; C. R. Vincent Jr., president and general manager; P. T. Wharton, vice president; and Haldeman Finnia, secretary-treasurer. The new company will probably fabricate stainless steel furnished by the Detroit mill.

TEACHING THE BLIND: Girls and boys at the Pennsylvania Institution for the Instruction of the Blind, Philadelphia, are taught to operate screw machines equipped with H & G self-opening thread cutting die heads manufactured by the Eastern Machine Screw Corp., New Haven, Conn. The blind pupils qualify as operators quickly

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Tru-Punch Co., New York, has announced its new address: Box 14, Kingsbridge Station, New York 63.

—o—

Rockwell Mfg. Co., Pittsburgh, has organized a subsidiary to handle the export sales of the parent company and its divisions. The new subsidiary, Rockwell International Corp., is located in the Empire State building, New York.

—o—

Jordanoff Aviation Corp., New York, has changed its name to Jordanoff Corp. and has extended its visual training aids to cover all types of industries.

—o—

Westinghouse Electric Corp., Pittsburgh, has completed plans to consolidate its electronics activities in three plants in the vicinity of Baltimore.

—o—

Formica Insulation Co., Cincinnati, has licensed De La Rue Insulation Ltd., London, to manufacture its products.

—o—

Bowser Inc., Ft. Wayne, Ind., has acquired the complete inventory of parts and finished units and the manufacturing rights of Torrington lubricators from Torrington Mfg. Co., Torrington, Conn., and will continue production of the latter's line of lubrication equipment.

—o—

Narragansett Wire Co., Narragansett, R. I., a newly-organized company, has acquired the plant of Anaconda Wire & Cable Co., Pawtucket, R. I.

—o—

National Bearing Division, American Brake Shoe Co., New York, has moved its sales office from 928 Shore Ave., Pittsburgh, to Grant Bldg., Room 1110, Pittsburgh 19.

—o—

Leslie Co., Lyndhurst, N. J., manufacturer of regulators, controllers, etc., has appointed the following as industrial sales and service agents: H. F. Eastman Co., Boston, for eastern Massachusetts; Wilson Engineering & Sales Co., Cleveland, for northcentral Ohio; Modern Electric & Engineering Co. Inc., Fremont, Nebr., for eastern Nebraska and western Iowa; and Mooney Engineering Co., Kansas City, Mo., for eastern Kansas and western Missouri.

—o—

Clifton Conduit Co. Inc., Baltimore, has re-arranged its plant and taken over additional space for the production of

electric steel metal tubing, rigid steel conduit and nonmetallic sheath cases.

—o—

Perfect Circle Co., Hagerstown, Ind., has announced resumption of its automotive clinic for dealers, repair shop personnel, jobbers, etc.

—o—

Tennessee Eastman Corp., New York, has announced that construction will begin shortly on the $300,000 addition to its administrative offices at Kingsport, Tenn.

—o—

Durabla Mfg. Co., New York, has moved its valve plant from Berwyn, Pa., to Wayne, Pa.

—o—

Linde Air Products Co., subsidiary of Union Carbide & Carbon Corp., New York, has announced plans for an oxygen filling station and acetylene producing plant at Centre Ave. near Owyhee St., Boise, Idaho.

—o—

Bendix Marine Division, Brooklyn, N. Y., Bendix Aviation Corp., has moved to its new plant at Norwood, Mass., and will continue its operations from there.

—o—

Shafer Bearing Corp., Chicago, has acquired an additional plant at Downers Grove, Ill. Production at the new plant is expected to begin in March.

Ross Engineering Holds 25th Birthday Celebration

J. O. Ross Engineering Corp., New York, recently celebrated its twenty-fifth anniversary with a dinner and theater party for the firm's employees. A feature of the event was the presentation of gifts to J. O. Ross, founder of the organization and now chairman of the board, F. W. Partsch, vice president, and Richard Schultz, both of whom were members of the company in 1921 when it was founded.

S. W. Fletcher, president, presented the gifts for the employees, and in response Mr. Ross spoke outlining the founding of the air handling equipment company.

Kaiser Plans Dish-Washing Machines Run by Water

Water-powered dish-washing machines will be manufactured by Kaiser Co. Inc. at its Bristol, Pa., plant beginning in April or May, according to Henry J. Kaiser, company president.

Instead of using conventional electric motors the Kaiser product will be powered by pressure of water coming from the household water system. The unit will be called the "Kaiser Jet-Propelled Dish-Washing Machine," Mr. Kaiser said.

At the Bristol plant, which houses the Fleetwing branch of the Kaiser Aircraft Division, tooling to produce the machines is almost completed, and the company is ordering parts needed in the manufacture of the unit. Output of the machines is expected to reach 10,000 a month soon after production starts. Kaiser-Frazer Corp., of which Mr. Kaiser is chairman, will not be associated with the new venture.

Because of the steel shortage, the dish-washing machines will be made of aluminum instead of steel, Mr. Kaiser said. The machines will be sold primarily through department stores, he added.

Koppers Acquires Wailes Dove-Hermiston Corp.

Acquisition of the entire common stock of Wailes Dove-Hermiston Corp., Westfield, N. J., by Koppers Co. Inc., Pittsburgh, has been announced in a joint statement by J. N. Forker, vice president of Koppers, and Linden Stuart, president of the New Jersey company.

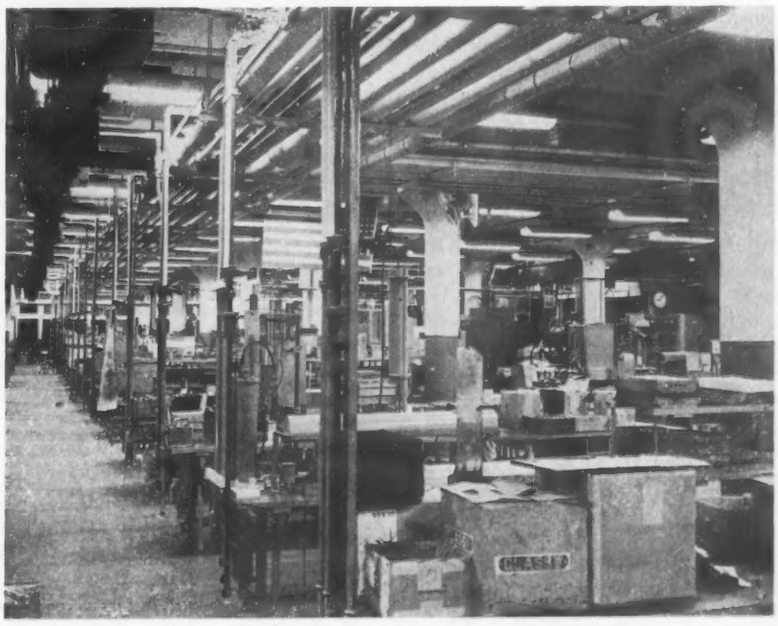
Koppers Co. Inc. is a designer and builder of coke ovens and manufacturer of by-products from coal, and Wailes Dove-Hermiston Corp. is a manufacturer and contractor of bituminous coatings for the protection of iron and steel against corrosion. The latter company will continue to operate as a separate organization with the same management

Federal Telephone & Radio To Produce FM Equipment

The entrance of Federal Telephone & Radio Corp., domestic manufacturing affiliate of International Telephone & Telegraph Corp., into manufacture of equipment for frequency modulation broadcasting was announced last week by E. N. Wendell, vice president in charge of radio engineering and sales. Mr. Wendell said that Federal is building FM broadcast transmission equipment for 170 installations for which deliveries will be made starting the end of March.

H. K. Porter Co. Acquires Oil Field Tool Producer

H. K. Porter Co. Inc., Pittsburgh, has acquired Hinderliter Tool Co., Tulsa, Okla., producer of oil field tools, according to T. M. Evans, president of H. K. Porter Co. Hinderliter Tool Co. will operate as a division under the direction of F. J. Hinderliter, founder and president.



SOLVE LIGHTING PROBLEM: Engineers at the Westinghouse Lamp Division, Bloomfield, N. J., solved a lighting problem in this plant by the unusual procedure of placing fluorescent fixtures above rather than below the overhead service pipes. This makes possible a more desirable mounting height which results in better distribution and minimizes luminaire brightness in the field of vision. The light which impinges on the upper sides of the obstructions is not lost but is redirected to the ceiling, providing a comfortable background brightness for the luminaires

Steel Strike Closing Fabricating Plants; Other Industries Affected

Building construction to be hard hit by stoppage. Warehouse stocks will be wiped out in 30 to 60 days. Public works and utilities delayed in construction and improvement programs. Kaiser's Fontana plant to supply only old clients

SAN FRANCISCO

EARLY experience with the steel strike indicates that a prolonged walkout will have serious effects on San Francisco fabricating companies and indirectly on a number of industries which depend on steel for their economic health.

Many companies in this area which ordinarily would have been affected immediately by the steel strike have been closed since Oct. 29 by the machinists' strike. However, there have been signs recently that the machinists may end their walkout fairly soon. It is doubtful, though, that the closed plants will be able to reopen as long as the steel strike continues.

The steel strike's effects are spotty at present. A manufacturer of steel barrels and household equipment here intends to reduce its two operating shifts to one as a means of conserving its present supply of steel. On this basis it believes it can keep operating for about two months.

All of American Can Co.'s northern California plants now are closed, and Pacific Can Co.'s plant is shut down because of the machinists' strike.

Supplies Are Waning

Oliver United Filters Co., world's largest manufacturer of industrial filters, reports that it can operate only a few weeks on its supply of sheet steel, but a little longer on bar steel. A dredge manufacturing company also anticipates being able to run only a few weeks on its present supply. A maker of hardware here, however, has enough backlog to keep up its present operations 60 to 90 days.

A company making industrial and home furnaces can operate about a month on present steel inventories, but the strike will delay deliveries on orders which already are far behind schedule.

A tractor manufacturing firm which has just reopened after being closed by a 12-week strike is fortunate in having a three-month supply of steel on hand, material which normally it would have used had it not been strike-closed for the past three months.

A large oil company operating in this area has steel maintenance supplies sufficient for only about 60 days. If the strike continues long, it believes it may have to close down some of its refinery units after that time. However, this company has enough drilling pipe on hand to carry it through the first quarter of this year. It does not expect a pipeline project which it has started to get more than 20 per cent beyond completion until after the strike ends.

Steel jobbers in this area point out that building construction may be hard hit by the strike. For example, none of the warehouses have reserve supplies of nails, an item that has been critically scarce for the last year. One large jobber said his stock, which normally amounts to about 40 carloads, now is down to 12 carloads. Stocks of galvanized and corrugated iron are nonexistent and deliveries are five months behind orders.

Supply Will Run Out Soon

Eight plants in the San Francisco area which supply building steel fabricates and similar products had some stock on hand when the strike began, but if orders from the building industry continue in the amount expected, the supply will run out shortly.

Robert Cortelyou, spokesman for steel jobbers in San Francisco, said that supplies in 22 warehouses in this area would be wiped out within one or two months.

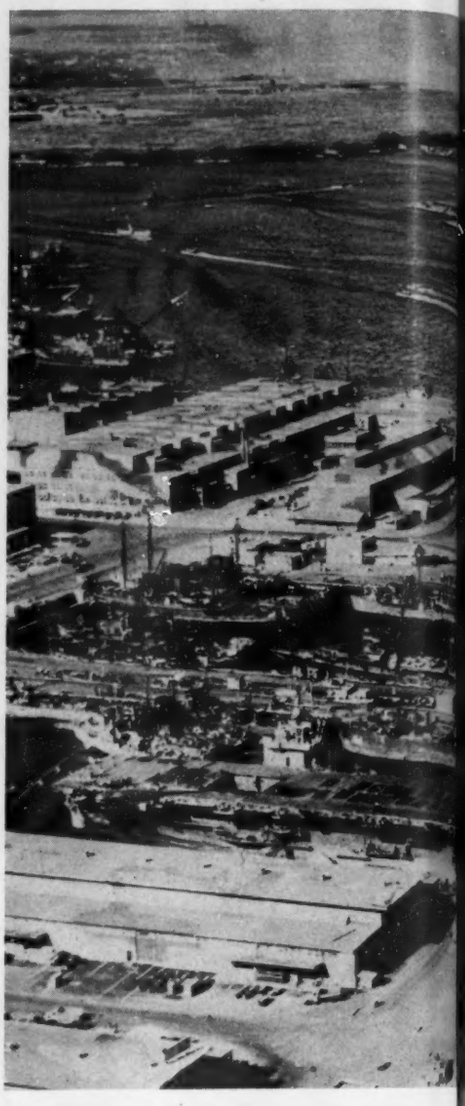
Public works and public utility projects also will be hit by the strike. For example, prolonged tie-up may delay work on several large utility projects under way now and the San Francisco Municipal Railway faces delays in its planned improvements.

Some West Coast fabricators who had counted on Kaiser's Fontana plant, which is not struck, to supply them with steel will be disappointed. Fontana is booked through June, the Kaiser firm says. These orders will be filled, but new customers will be rejected because Fontana's facilities are sufficient only to take care of older clients.

Fabricating Companies Scraping Barrel Bottom

LOS ANGELES

Highlights of the situation in Southern California as work stoppages in 46 plants



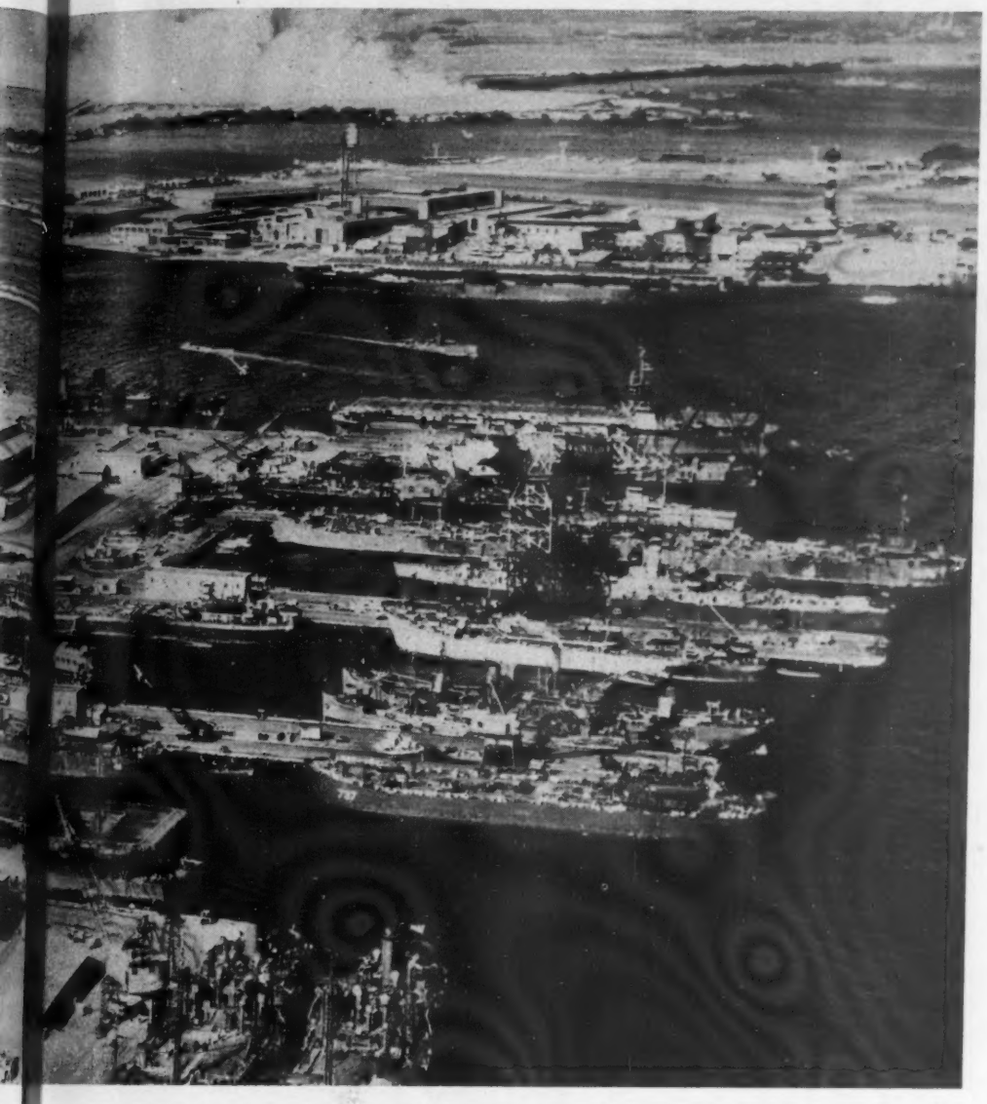
brought out some 16,000 workers in basic steel plants, were:

Fabricating plants were nearing the end of inventories on already scarce items and as a result they were facing shutdowns.

Army truck drivers were ordered to obtain union permission before crossing picket lines. The order was issued by Maj. Gen. William Shedd, Ninth Service Command chief with headquarters at Ft. Douglas, Utah. The action brought a report that the House Military Affairs Committee would investigate.

Seven southern California foundries telegraphed President Truman that they employ about 1500 workers and are willing to increase wages if they can be assured of federal permission to increase prices. The telegram sought such assurance. It stated that the companies were negotiating with the union when the big walkout took place and that they have since been unable to effect separate dealings.

Signers of the telegram were the Warman Steel Casting Co., Alloy Steel Cast-



Visible evidence of United States sea power is seen in this aerial view of Pearl Harbor, the Navy's powerhouse of the Pacific. Shown are three aircraft carriers, half a dozen LST's and numerous other craft as well as some of the construction carried out during the war. U. S. Navy photo from NEA

ing Co., Dayton Foundry, Pacific Cast Iron Pipe & Fitting Co., Westlectric Castings Inc., Madsen Iron Works, Magnesium Alloy Products and Kinney Iron Works Inc. These stated that they spoke for many other foundries in a similar predicament.

Steel plant picket lines are relatively peaceful following friction between police and strikers during the early stages of the walkout. Mayor Fletcher Bowron of Los Angeles is backing police in successfully maintaining rights to cross lines of nonstriking employees.

Strikers, however, are pursuing a policy of ignoring court orders against mass picketing on the grounds that such injunctions are unconstitutional. Hearings on the arguments have been set.

C. L. Emerson, assistant manager of the Kaiser Steel Co. sales office in Los Angeles, said the firm is being flooded with orders, chiefly for structurals, light plate, flange plate and the merchant items now in production.

California Plans $1.1 Billion Works Program

SAN FRANCISCO

More than $1.1 billion of public works have been tentatively set for construction, or a start on construction, in California during the three years 1946-48 by local, state and federal agencies, the State Reconstruction & Re-employment Commission reports.

Working plans have progressed to the point where more than $577 million of projects tentatively is scheduled to begin in 1946. Another $546 million of improvements to present structures is scheduled to begin during 1947-48.

Lower Rate on Scrap Shipments To East Opposed

Western interests want to keep high-grade shipyard scrap for use in steel manufacture. Final decision up to ICC

SAN FRANCISCO

A battle between West Coast steel companies and midwestern firms over 300,000 tons of high-grade shipyard scrap was fought out in San Francisco. At an Interstate Commerce Commission hearing before Trial Examiner F. R. Linn, the West Coast manufacturers, aided by chambers of commerce and other interests, charged the midwestern companies with an attempt to requisition the Coast's supply of scrap and thus prevent development of steel fabricating facilities in this area.

Specifically, the argument centered on a proposed reduction in railroad rates which would permit the scrap to flow eastward at $12.32 a long ton to the Chicago area from the present rate of $14.78. Transcontinental railroads last year filed a tariff with the ICC to reduce the rate to $12.32 for a four-month period, but the rate was suspended at the request of western steel companies, foundries and chambers of commerce, until July. The results of the San Francisco hearing will be sent to the full Interstate Commerce Commission in Washington for a decision whether or not to make the suspension permanent.

Arguments on Scrap Supply

Arguments before the examiner here chiefly were on the question of the Coast's scrap supply. Westerners maintained that "Midwest firms are trying to take the scrap away from the Coast and return it in the form of finished goods" to the detriment of western fabricators. Midwest interests on the other hand claimed that the Coast "has a surplus of scrap as is shown by prices falling below OPA ceilings."

San Francisco steel spokesmen admitted there is more scrap steel available now on the West Coast than in the Midwest or East, but said the West is relying on scrap to make steel.

"We are using very little pig iron or raw materials which we would have to import, principally from the east," West Coast spokesmen said. "Scrap steel, already once refined, affords quicker results in turning out high-grade steel."

MEN of industry

K. C. Gardner Jr. has been elected vice president in charge of operations, United Engineering & Foundry Co., Pittsburgh. **Geoffrey G. Beard** has been named vice president and executive assistant to the president and **William Hagel,** formerly vice president in charge of machinery sales, has been named vice president in charge of sales.

—o—

S. P. Flenniken Jr. has been appointed manager, office equipment sales for the Berger Mfg. Division, Canton, O., Republic Steel Corp. Mr. Flenniken has been associated with the Berger division since 1937 when he became district representative in the Harrisburg, Pa., territory.

—o—

Carboloy Co. Inc., Detroit, has announced the following appointments in its sales department: **Harry Crump,** recently assistant to the vice president, has been advanced to chief tool sales engineer; **A. E. Glen** is manager, Die Sales Division; **J. E. Weldy,** manager, distributor sales; and **G. M. Chandler,** since 1937 sales engineer in the Chicago district, has been appointed assistant to the vice president in charge of sales.

—o—

C. J. Ramsburg, vice president, Research Division, Koppers Co. Inc., Pittsburgh, has retired. Mr. Ramsburg joined H. Koppers Co., Chicago, a predecessor company, as vice president in 1913.

—o—

Benjamin H. Jones, assistant vice president, National Screw & Mfg. Co., Cleveland, has been appointed general sales manager. **Charles W. Baker** is manager of technical sales; **Harold W. LaGanke,** manager, distributor sales; **A. L. Murdoch** and **Charles L. Kerr,** assistant sales managers.

—o—

H. G. Sharp, assistant general manager, General Machinery Ordnance Corp., has been appointed general manager, Graver Tank & Mfg. Co. Inc., East Chicago, Ind. **William G. Shipman** is plant superintendent at the company's plant at East Chicago.

—o—

Frank R. Markley recently was appointed general sales manager, Sun Oil Co., Philadelphia. He is succeeded as manager, industrial products department, by **Ray H. Anders. Maximilian H. Leister** has been named general manager, motor products department.

—o—

Roland A. Sherwood has been named assistant to the president, American Locomotive Co., New York.

—o—

Harvey A. Craig has been appointed Pacific Coast manager, Republic Steel Corp., Cleveland, and remains also as manager of the company's Los Angeles office. **W. L. Thoma** is district sales manager at San Francisco and **C. V. Gardner,** district sales manager, Seattle.

—o—

A. vanderZee, vice president in charge of sales, Chrysler Corp., Detroit, has been elected to the board of directors of that corporation.

—o—

Edward L. Dull has been appointed Chicago district sales manager for Pittsburgh Steel Co., Pittsburgh. Since 1937, Mr. Dull has been sales representative in the Chicago area for Babcock & Wilcox Tube Co.

—o—

Louis E. Mohr, for the past 12 years associated with Johns-Manville Sales Corp., Chicago, as sales engineer in the Steel Products Division, has been elected vice president, John Mohr & Sons, Chicago, heavy steel plate fabricators, engineers and machinists.

—o—

C. A. Dunham, president, C. A. Dunham Co., Chicago, has resigned and has been succeeded by **H. S. Marshall.** Mr. Dunham founded the company in 1903.

—o—

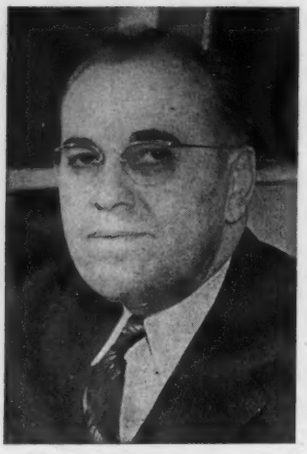
William G. Pinkstone, formerly vice president, West Co., Philadelphia, has become vice president, General Grinding Wheel Corp., and executive vice president, West Abrasives Inc., Philadelphia.

—o—

Alexander H. Gaal has been appointed merchandising manager, Earle M. Jorgensen Co., steel distributor with warehouses in Los Angeles, Oakland, Calif., and Houston, Tex. Prior to service in the Army and with War Production Board, Mr. Gaal had represented Republic Steel Corp., in Cleveland and also in Los Angeles.

—o—

S. V. Weed has been appointed general manager, Jarvis Engineering Works,



A. A. LADWIG

Lansing, Mich., to succeed the late **E. R. Dail.** Mr. Weed has been with the Jarvis company since 1920 and he also is manager, Jarvis-Flint Erection Co.

—o—

Arthur A. Ladwig has been appointed vice president in charge of manufacturing, Le Roi Co., Milwaukee. Mr. Ladwig has been with the company since 1923 and has served as works manager since 1942.

—o—

Oscar D. Nelson, who joined the Butler Mfg. Co., Kansas City, Mo., in 1910 as office boy, has been elected president and general manager of that company. He succeeds **E. E. Norquist,** one of the founders of the company, who becomes chairman. **F. A. Rufi** has been elected treasurer; **Glen C. Speakman,** vice president; **C. C. Crouch, Roy S. Kemp** and **John Nelson** have been re-elected vice presidents. **Darius Melcher** was named manager of the company's Minneapolis Division.

—o—

Ellwood Industries, Los Angeles, has named the following to its executive personnel: **H. R. Edwards,** sales manager, eastern region, Farm Equipment Division; **George Kis,** electronics laboratory technician; **M. C. Nelson,** supervisor, hydraulic research laboratory; **Albert Rebel,** export sales manager, Farm Equipment Division, and **Edward M. Sumner,** electronics laboratory research director.

—o—

William E. Bradley has been appointed director of research, Philco Corp., Philadelphia, succeeding **David B. Smith** who recently became vice president in charge of engineering.

—o—

Marshall H. Jones, recently released following two years active service with the Navy, has been elected vice president

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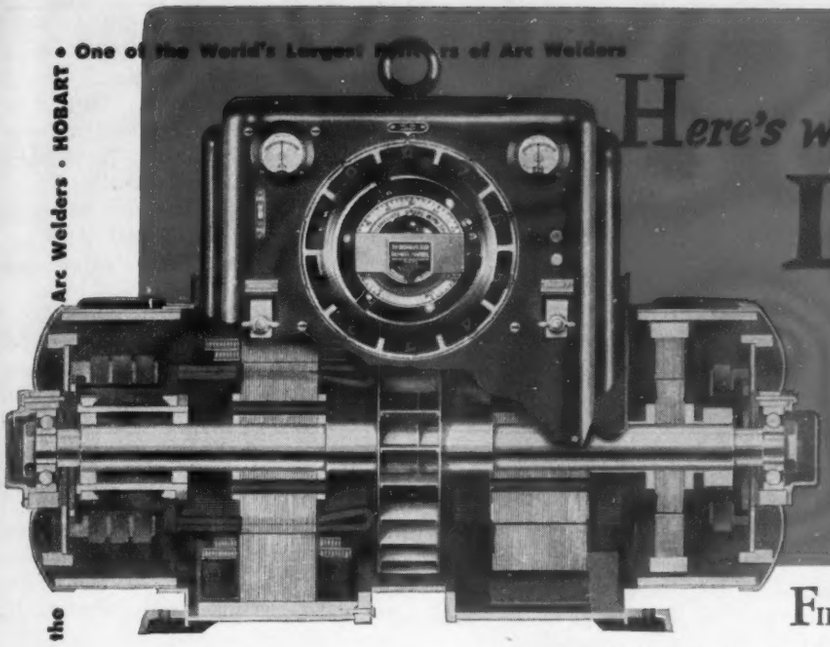

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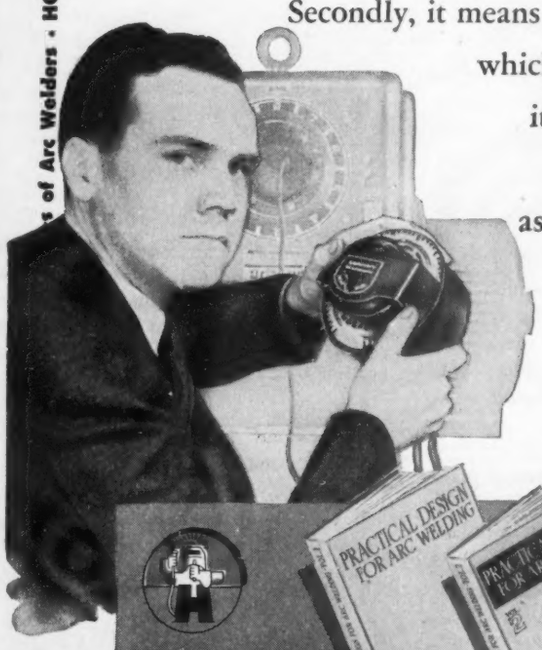

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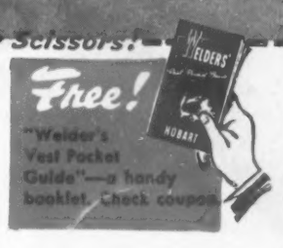

Name _____

Position _____ *Firm* _____

Address _____

JACK GREEN

G. A. MILTON

and general manager, Globe Iron Co., Jackson, O. **Edwin A. Jones** continues as president and **Charles P. Chapman** has been elected secretary-treasurer.

—o—

Jack Green has been appointed sales manager of the Welding Fittings Division, Tube Turns Inc., Louisville, Ky. Succeeding him as assistant sales manager of that division is **Tom Pike** who joined the company in 1940. **Jack Ellsworth** has been placed in charge of the company's newly opened Detroit office and he will represent its Forging and Welding Fittings Divisions.

—o—

Joseph J. Gilbert recently has returned to the Link-Belt Co., Chicago, from wartime service with the Army Sanitary Corps. Mr. Gilbert has been named sales engineer, Sanitary Engineering Division, filling the vacancy caused by the retirement of **M. B. Tark.** Mr. Gilbert will make his headquarters in Philadelphia.

—o—

Albert E. Zeisel, former midwestern regional sales manager for the Eutectic Welding Alloys Co., New York, has been appointed assistant to the president in charge of sales.

—o—

The photograph of **Frank M. Beauregard,** who recently was named operating manager of plants in Warren and Salem, O., Mullins Mfg. Corp., as reproduced in the Jan. 28 issue of STEEL was incorrectly identified as that of **H. M. Heckathorn,** who has been appointed executive vice president of the Mullins company.

—o—

Westinghouse Electric Supply Co. has announced the following appointments: **Robert P. Smith,** manager, midwest district with headquarters at St. Louis; **Ralph E. Lovdal,** manager, northern district, headquarters in Milwaukee; **Douglass B. Williams,** manager, east central district, headquarters in Pittsburgh. **Clarence G. Ward** has been named manager of the Peoria, Ill., branch.

—o—

George A. Milton, president, George A. Milton Can Co., Brooklyn, N. Y., has been re-elected president, Can Manufacturers Institute. **H. Ferris White** was re-elected executive vice president and **Clifford Sifton,** secretary-treasurer.

—o—

Michael Leyava has joined the James Flett Organization, Chicago, as manager of its Cleveland branch office. Mr. Leyava during the war was with the salvage and scrap section, Industrial Division, Office of the Chief of Ordnance, Washington.

—o—

H. C. Bostwick has been named representative in the area including western Pennsylvania, western New York and Ohio, Drever Co., Philadelphia. Mr. Bostwick will make his headquarters at Shaker Heights, O.

—o—

Melvin C. Shaw has been named manager, blower and compressor department, Allis-Chalmers Mfg. Co., Milwaukee, succeeding **John Avery,** who has resigned.

—o—

H. W. Deuker recently was appointed works manager of the Cincinnati plants of the Manufacturing Division, Crosley Corp. **O. E. Norberg** has been promoted to manager of refrigeration and appliance engineering, Manufacturing Division.

—o—

Paul D. Cornelisen has returned to Curtis Lighting Inc., Chicago, to assume duties as general sales manager. Mr. Cornelisen served with the Navy for more than 3 years attaining the rank of commander.

—o—

James A. Lane, formerly of the Chicago office, has been transferred to the New York office, General American Process Equipment Division, General American Transportation Corp., as assistant to the sales manager. **James F. Olsen,** sales manager, Turbo-Mixer Corp., a unit of General American Transportation Corp., has been transferred to the Chicago office General American Process Equipment Division as manager of sales.

—o—

Joseph E. Cain has been elected president and **Philip R. Mallory,** chairman, P. R. Mallory & Co. Inc., Indianapolis. Mr. Cain, associated with the company 18 years, formerly was executive vice president.

—o—

Donald Carr, recently discharged from the Army, has been appointed sales manager in charge of hoist and trolley sales, Conco Engineering Works, Mendota, Ill.

—o—

Julian M. Avery has resigned as vice president in charge of research and development, Diamond Alkali Co., Pittsburgh, to establish a private consulting practice with headquarters temporarily at his home, Mentor, O.

—o—

Dr. Charles F. Goodeve, who recently was appointed director, British Iron & Steel Research Association, was awarded a knighthood in the New Year's honors list.

—o—

Frederick A. Preston, vice president, Poor & Co., Chicago, and **Brig. Gen. Thomas S. Hammond,** (retired), chairman, Whiting Corp., Harvey, Ill., have been granted the War Department award for exceptional civilian service in recognition of their work as chiefs of the Chicago Ordnance District.

—o—

Dr. Daniel S. Eppelsheimer has become associated with Metal Hydrides Inc., Beverly, Mass., as sales manager and chief physical metallurgist. Dr. Eppelsheimer formerly was acting director, Engineering Experiment Station, University of New Hampshire.

—o—

John M. Guthrie has been appointed technical director, Fidelity Chemical Products Corp., Newark, N. J. The company also has appointed the following sales service engineers: **Allen A. Ainsworth,** northern New Jersey; **Seymour B. Lonyai,** Newark, N. J., and southern New Jersey; **Abraham Schorr,** New York City.

—o—

W. A. Finn, recently released from service with the Navy, has been appointed export manager, Worthington Pump & Machinery Corp., and will have headquarters at Harrison, N. J. Mr. Finn

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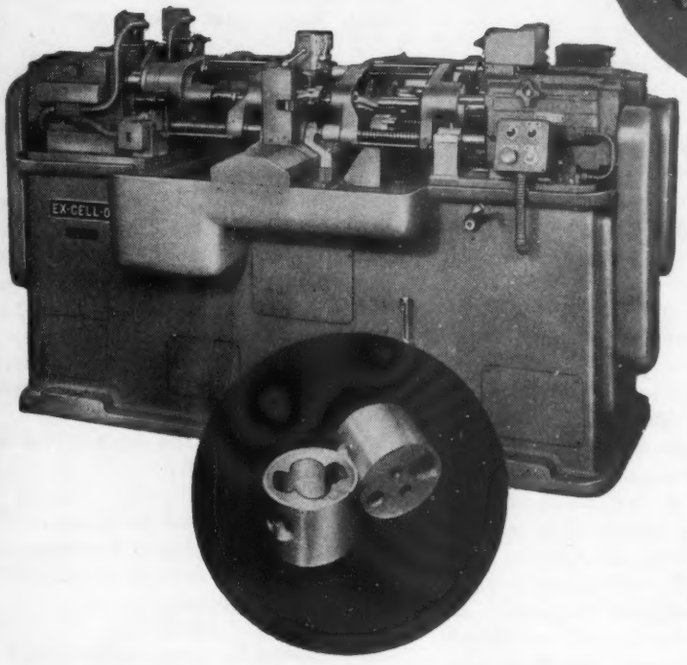

Above: Ex-Cell-O Hydraulic Power Unit Style 28-A.

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To left: Ex-Cell-O Small Style No. 21 Hydraulic Units being used for accurately drilling holes in oil pump bodies. This small unit makes for less floor space. It has all the features of the larger units and can be operated individually or in combination.

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TED NAGLE

H. D. KELSEY

succeeds **George Gellhorn** who has become associated as general manager with **C. E. Halaby,** industrial machinery dealer in Colombia, South America.

—o—

Ted Nagle has been appointed director of sales and advertising, Hydraulic Machinery Inc., Dearborn, Mich., and its associated companies, Superdraulic Corp., Dearborn, Steel City Testing Laboratory, Detroit and Electro Mechanical Devices Co., Detroit.

—o—

Henry E. Craven has returned from Army duty to his position as plant superintendent, Pemco Corp., Baltimore.

—o—

E. E. Ames will retire July 1, 1946 as director of sales, General Box Co., Chicago, and will be succeeded by **N. A. Fowler,** who is at present vice president and director of research.

—o—

Don G. Mitchell has been elected executive vice president, Sylvania Electric Products Inc., Ipswich, Mass. Mr. Mitchell joined the company as vice president in charge of sales in 1942.

—o—

Robert S. Aitchison has rejoined Lindberg Engineering Co., Chicago, to take charge of its advertising department. During service with the Navy, Mr. Aitchison supervised production of training films on welding, silver brazing, radio and radar.

—o—

Lachlan W. MacLean, since 1937 manager of the New York sales office, Dampney Co. of America, Boston, has been transferred to become manager of the Boston sales office.

—o—

John Quinn, manager of the Canton, O., plant, and a director of the United Engineering & Foundry Co., Pittsburgh, has been elected chairman of the board of directors, Adamson United Co., Akron, subsidiary of United Engineering & Foundry Co.

—o—

H. D. Kelsey has been appointed managing engineer of the new Aircraft Gas Turbine Division, Lynn, Mass., General Electric Co. Mr. Kelsey has been associated with the company since 1920 and since 1944 he has been works engineer at Ft. Wayne, Ind., where he supervised all engineering.

—o—

Robert Maynard has returned to his position as export manager, Osgood Co. and General Excavator Co., Marion, O.

—o—

Lawrence E. Riddle has retired after 53 years of service with Carnegie-Illinois Steel Corp., Pittsburgh. He was general superintendent of Isabella furnaces at Etna, Pa. The Isabella furnaces now are combined with the Clairton steelworks under **H.W. Seyler,** general superintendent of combined operations. Mr. Riddle is a co-founder of the Eastern States Blast Furnace & Coke Oven Association.

—o—

Alfred H. Eubank has returned to his duties in charge of research in the sales department, Tennessee Coal, Iron & Railroad Co., Birmingham, after nearly 4 years active duty with the Navy.

—o—

J. A. Stearns has been appointed manager of the recently opened southern district sales office, Birmingham, Baldwin Locomotive Works, Philadelphia.

—o—

E. R. Standfuss has been appointed general manager, Shunk Mfg. Co., Bucyrus, O.

—o—

William R. Odell Jr., assistant treasurer, International Harvester Co., Chicago, has been named treasurer to succeed **Arnold B. Keller,** who will retire Feb. 1 as vice president and treasurer. **Forest D. Siefkin,** vice president in charge of industrial relations, will assume the added duties of general counsel, to succeed **William S. Elliott,** who is retiring as vice president and general counsel. Mr. Keller, with 33 years' service, and Mr. Elliott, with 34 years, will continue as directors and will be available to the management as senior consultants.

—o—

H. B. Jorgensen has been appointed comptroller, Wallace Supplies Mfg. Co., Chicago.

—o—

Wyman Eaton retires as president, Freyn Engineering Co., Chicago, effective Feb. 1. He will continue as a director of the company. **L. T. Shorley** has been elected president and treasurer.

—o—

Stewart S. Cort has been made manager of sheet and tin plate sales, Bethlehem Pacific Coast Steel Corp.

—o—

Fred E. Harrell, general works manager, Reliance Electric & Engineering Co., Cleveland, has been elected a member of the board of directors.

—o—

C. L. Hardy, who has served in various sales and metallurgical capacities in the New England territory since 1927, has been named manager at Philadelphia, Joseph T. Ryerson & Son Inc., Chicago.

—o—

E. B. Pool, for 10 years a mechanical and experimental engineer with Chrysler Corp., has been appointed to conduct valve research work by Edward Valves Inc., East Chicago, Ind.

—o—

H. E. Replogle has been appointed manager of tool steel sales development, Universal-Cyclops Steel Corp., Universal Division, Bridgeville, Pa.

—o—

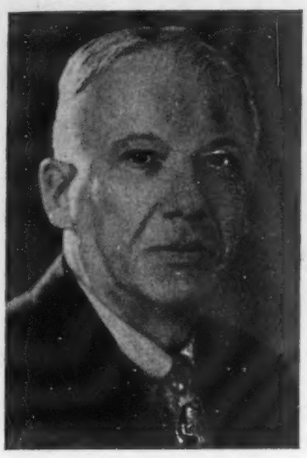
J. H. Patton has been appointed manager, in charge of sales and operations, Electric Welded Tubing Division, Brainard Steel Corp., Warren, O. **Charles E. Nail,** formerly of Ohio Seamless Tube Co., Shelby, O., has become associated with that division. **Lester J. Lyons,** formerly eastern sales manager, New York, has been appointed manager of sales, Strapping Division, and **J. C. McGunnigal** has returned from service with the Navy to become sales manager, Strip Steel Division.

—o—

Joseph P. Argyle, vice president and director, Vierling Steel Works, Chicago, has retired after 56 years' continuous service with the company.

—o—

James H. Kellogg, formerly vice president and secretary, Kellogg Switchboard & Supply Co., Chicago, has been elected president to succeed his father, **James G. Kellogg,** who now is chairman. Other



J. R. FERGUSON

Who has been named director, automotive engineering, Packard Motor Car Co., Detroit, as noted in STEEL, Jan. 28 issue, p. 110.

CAL R. WOOD

Who has been appointed purchasing agent, Aetna Standard Engineering Co., Youngstown, noted in STEEL, Jan. 28 issue, p. 110.

NEWTON O. HOLT

Who is senior contracting manager, Chicago district, American Bridge Co., Pittsburgh, noted in STEEL, Jan. 14 issue, p. 76.

new officers elected are: **Harry C. McCluskey,** executive vice president and treasurer; **Claude D. Manning,** vice president and secretary, and **Harvey O. Edson,** assistant treasurer and assistant secretary.

—o—

E. E. Hyman has been appointed manager of marine sales, National Malleable & Steel Castings Co., and will make his headquarters in Cleveland. **Ellsworth H. Sherwood** has been named New York and New England district manager for the company's Railway Sales Division, and will have offices in New York. **Floyd Snyder** has been advanced to sales agent at the New York office and **George F. Wilhelmy** has been promoted to sales agent in the Railway Division's Cleveland office.

Ray G. Noble has returned to his position as advertising manager, Union Wire Rope Corp., Kansas City, Mo., after 3 years' service with the Army.

—o—

W. E. Haarbauer has joined the Reynolds Wire Co., Dixon, Ill., as general wire mill superintendent. Mr. Haarbauer formerly was associated with the Townsend Co., New Brighton, Pa.

OBITUARIES...

James P. Allen, 74, former president, Union Steel Castings Division, Blaw-Knox Co., Pittsburgh, died Jan. 23. Mr. Allen was a past president, Steel Founders' Society of America.

—o—

Arthur B. Sheets, 71, former president, Hillman Coal & Coke Co., Pittsburgh, died in that city Jan. 23.

—o—

William Herman, 82, former owner and president, Fosdick Machine Tool Co., Cincinnati, died recently in that city. He retired from business in 1914 when he sold the Fosdick company.

—o—

Elmer R. Dail, 58, manager, Jarvis Engineering Works, Lansing, Mich., died Jan. 17 in that city. Mr. Dail also was president, Flint Structural Steel Co., Flint, Mich., and the Jarvis-Flint Erection Co., Lansing and Flint.

—o—

Howard Tallerday, 63, who retired recently as chairman, Western Pipe & Steel Co. of California, San Francisco, died Jan. 26 in that city.

—o—

Dr. Harry F. Waite, 74, president, Waite Mfg. Division Inc., Cleveland, Picker X-Ray Corp., died recently at his home in Hollywood, Fla.

—o—

Freeman D. Lohr, 53, works manager, Seaboard Division, Kearney, N. J., Koppers Co. Inc., died recently. Mr. Lohr had been associated with the company for approximately 30 years.

—o—

Henry R. Potter, 68, president of the exporting company, H. R. Potter & Co., New York, and also director of export for Central Ohio Steel Products Co., Galion, O., died recently in New York.

—o—

Theodore Moreno Lucas, 57, assistant manager, general sales and service department, Wright Aeronautical Corp., Paterson, N. J., died Jan. 24 in that city.

—o—

Henry T. Lees, 63, industrial engineer with Morris & Van Wormer, New York, died recently in that city.

—o—

William C. Boren, 86, president, Carolina Steel & Iron Co., Greensboro, N. C., died recently in that city.

—o—

Walter Gussenhoven, 68, former general manager, Mechanical Goods Division, United States Rubber Co., New York, died at his home in Ridgewood, N. J., Jan. 21. He had been associated with the rubber company 47 years.

—o—

Harry A. Zeller, 74, who retired in 1945 as vice president and general manager, West Virginia Steel & Mfg. Co., Huntington, W. Va., died at his home in that city Jan. 22.

—o—

Rupert A. Nourse, 72, chairman, Midland Co., Milwaukee, died in that city Jan. 21. Mr. Nourse was president of the company from 1913 to 1940, when he resigned due to ill health.

—o—

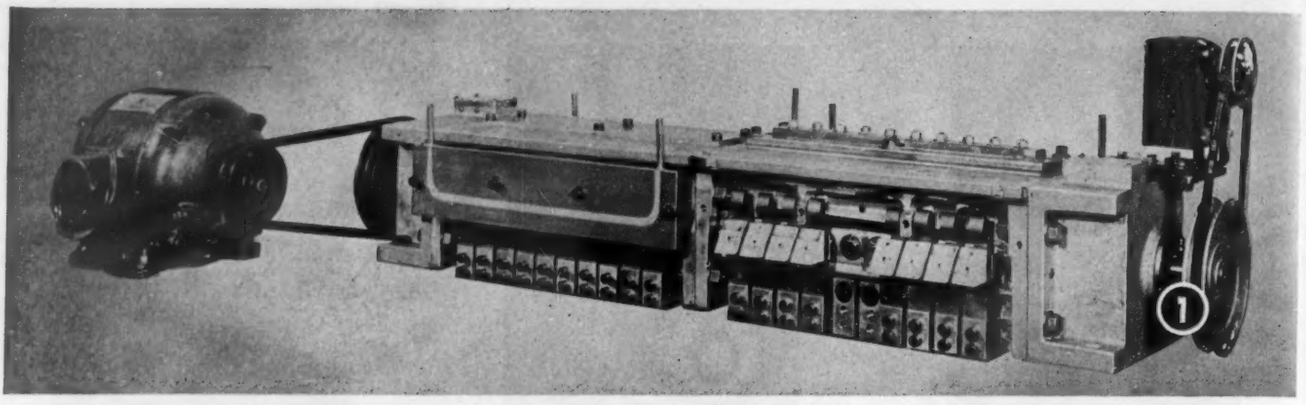
Samuel J. Simmons, 64, former assistant general sales manager, Aluminum Co. of America, Pittsburgh, died Jan. 24 at his farm in Unionville, O. Mr. Simmons retired May 1, 1944.

—o—

Mrs. Olive E. Frank, 56, president, Frank Heaters Inc., Paterson, N. J., died Jan. 28 in that city. Mrs. Frank was the first woman member of the American Society of Heating & Ventilating Engineers, and was the organizer of the company of which she was president.

—o—

Albert K. Andrews, 67, retired president, Andrews Steel Co., Newport, Ky. died Jan. 28 in Palm Beach, Fla.



Large number of joints made in one operation with aid of control permitting automatic assembly welding rates up to 900 spots per minute

HIGH-SPEED WELDER CONTROL

THE new high-speed welder control unit which appears in Fig. 1 promises to reduce practical production limitations of multiple-spot resistance welding machines to the time required to load and unload parts. The unit, at top speed, permits automatic assembly welding rates of up to 900 spots per minute, and is designed to meet increased demand for fully automatic welding machines of the type capable of producing a large number of joints quickly in one operation.

Made by Progressive Welder Co., Detroit, the control is part of all of that company's high-speed welding machines. It distributes welding current to a single point or to groups of welding points successively by means of a screw-driven carriage that depresses push rods to engage contacts in the same manner as one would run a finger over a piano keyboard. At the same time, another element of the carriage engages adjustable stroke plungers to control individually the length of time welding current flows for each weld.

All welding points bear on work simultaneously under welding pressure before the first weld is formed and remain until the last weld is completed, eliminating separate *squeeze* and *hold* times usually required for each weld. Thus 20, 50 and 100 or more joints can be made in slightly more time than the total of the individual *weld* times—at a few hundredths of a second each.

Welders such as the one shown in Fig. 2 are built to accommodate an almost unlimited range of weld spacings and locations such as are required by automotive, refrigerator, stove, subassemblies etc., (sometimes composed of many parts). This machine is used for automatic assembly welding of hospital ward cell panels.

Integral loading and clamping fixture mounted on horizontal carriage is moved into the machine by hydraulic motor at high speed, automatically slows down and stops at first

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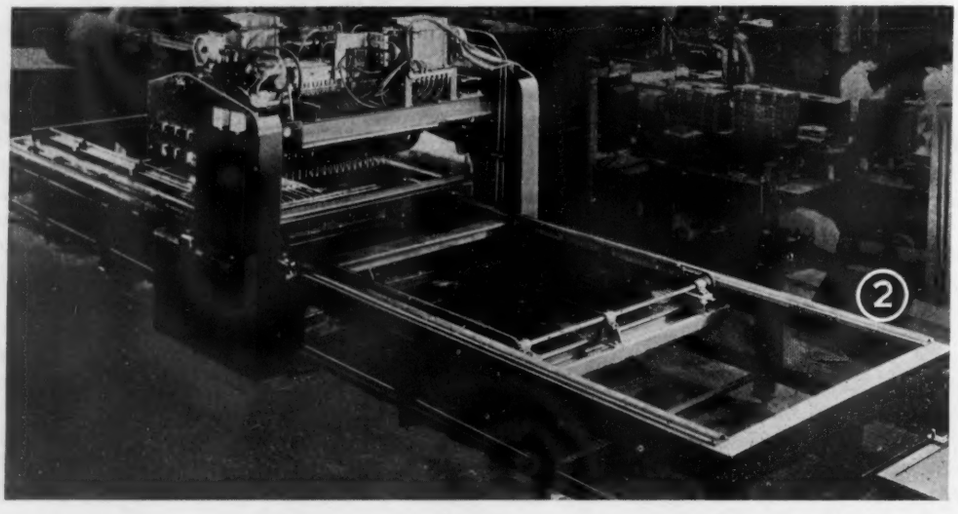


Engineering NOTES

Tests Bridge Models

A new field for aerodynamic research opened up after failure of the Tacoma Narrows bridge, for it now appears no major suspension bridge will be built in future without first subjecting a model to wind tunnel tests. Professor F. B. Farquharson of University of Washington, explaining to Baldwin Locomotive Works the extensive use in the university laboratory of Baldwin's SR-4 strain gage, says the tests make use of a 1/50 size model 100 ft long. Jet of air passing over model measures 4 x 100 ft; according to Froude's law, the reduction of the velocity by ratio of the square root of 50 makes possible duplication of a 125-mile gale by a wind of approximately 18 mph. The SR-4 gages are used in connection with a Brush oscillograph to study the motion and damping characteristics of the structure.

Lead Plays New Roles

Among the many new uses and adaptations of lead which came to light during the war are hot-dip lead alloy coatings on steel, used extensively on Army radio containers, on pole line hardware and other materials susceptible to corrosion. Cast lead, where strength and stiffness are required in hard lead flanges; frangible bullets of lead powder and plastic; establishment of high lead content bearing metals; lead alloy stamping dies; foil packaging materials, and molds for plastics, stand forth as new applications. According to Lead Industries Association, electroplated and sprayed lead coatings also have established their worth.

Homogenizing Metals

Homogenization of metals, a process supposedly capable of evenly distributing alloying elements within the molten mass and of eliminating gas pockets during solidification, is a new item for engineering speculation. Theory is that helium can be introduced into rotor chamber along with molten aluminum to produce sponge metal light enough to float. However, increased strength and uniformity of internal structure is declared the primary objective of homogenization by Marco Co. Inc., Wilmington, Del., makers of the machine. In operation, meshing rotors, revolving within chamber holding product to be homogenized, mechanically break down larger particles in fluid which is also subjected to pressures from 25 to 750 psi. As fluid passes through rotary valve at outlet, further homogenization takes place. A special stainless alloy steel was developed to overcome earlier seizure and galling caused by extremely close clearances (0.0002-in.).

Stamping Shows Progress

Advances made in the stamping art during the past 5 years have been greater than would normally have been made in 20 years, Ernest C. Morse of Lockhart International Inc., New York, last week told members of the Pressed Metal Institute. He pointed out that design and production engineers are much better informed regarding these advances, particularly in production and assembly of stampings, than they were before the war. Acting as a clearing house, the Pressed Metal Institute is making every effort to acquaint designers and executives with current developments.

New Laboratory

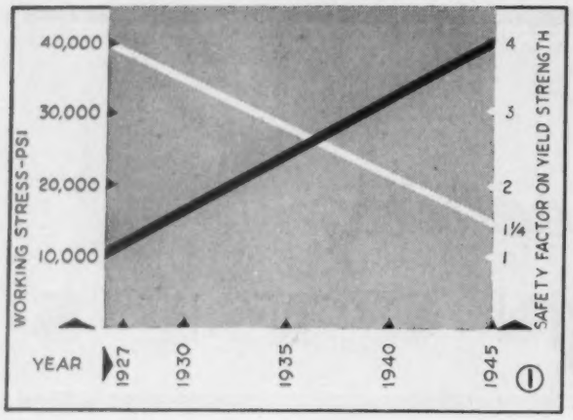
Unusual features of a laboratory soon to be completed at New Providence, N. J., include welded pipe lines for distribution of oxygen and industrial gases; specially constructed rooms for experiments in gas combustion and processing of metals; and movable steel partitions, permitting maximum flexibility of interior working space. With floor area equivalent in size to the average city block, main unit and two adjacent buildings of laboratory will house the 150 staff members of Air Reduction Sales Co.'s Apparatus Research Department.

Make Nitric Acid From Air

Notable recent process using high temperature technique to produce nitric acid from the nitrogen of the air is the (University of) Wisconsin process. It involves heating air to 4200° F, where some of its nitrogen and oxygen will combine to give about 1.75 per cent nitric oxide in the resultant gases, and then quickly quenching the gases to preserve the nitric oxide. The latter is converted by the oxygen of the air to nitrogen dioxide. Dissolved in water, nitrogen dioxide forms nitric acid. Pilot plant, in space only 3 ft in diameter, is daily producing around 2 tons of 100 per cent nitric acid.

Sealed-In Controls

Packaging of standard electrical controls to prevent fire from insulation breakdown or excessive arcing of relays, contactors, circuit breakers and switches for high-altitude aircraft has led Cook Electric Co. into permanent packaging where equipment is hermetically sealed into metal container for trouble- and dust-free lifetime operation. Container is shaped to fit parts and available space, has provisions for all necessary electrical features and includes test lamps and inspection ports. After assembly, each unit is (1) heated to do away with moisture, (2) is evacuated of all air and filled with an inert gas high in thermal conductivity and (3) is then sealed "for keeps." Radiating flanges and bellows sections also act to check overheating in service. Finally, each package is tested for gas leaks.



40-FOOT 1,000,000-AMP Butt Weld

. . . . permits mass production of large diameter pipe by special forming-welding-sizing process highly developed by A. O. Smith Corp. engineers

WHILE records indicate the invention of pipe dates back to the dawn of civilization, it was not until about 125 years ago that steel pipe was introduced. Even then, almost another century passed before mass production of large diameter steel pipe became a practical reality. As late as 1927, total capacity of the United States for making pipe 20 in. in diameter and larger was only about 3 miles per day.

The trend or gradual change in pipe line practice that has taken place since the introduction of the Smithway welded pipe in 1927 is graphically portrayed in Fig. 1. Note how utilizing more fully the high strength of steel and the greater uniformity in modern line pipe has permitted increasing the working stress from 10,000 to 40,000 psi, at the same time it has been possible to reduce the safety factor on yield strength from 4 to 1¼—allowing extremely important economies. In fact, these are the engineering reasons behind the extensive growth of pipe line transportation of petroleum products in recents years.

Dependable manufacturing and testing methods are back of the amazingly successful application of this improved pipe. They are well worth a detailed examination for they embody a number of advanced production techniques.

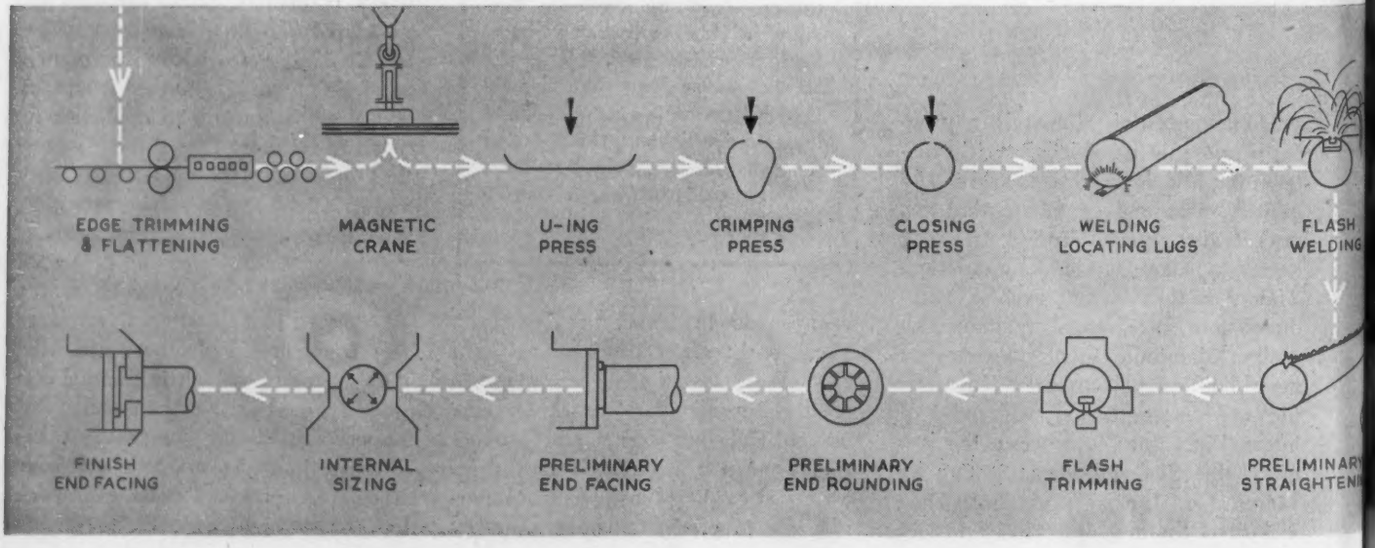
This pipe is all made from rolled steel—called skelp by

Fig. 1—This chart shows how utilizing more fully the high strength of steel has permitted increasing working stress from 10,000 to 40,000 psi, at same time reducing safety factor on yield strength from 4 to 1¼—allowing important economies and bringing the pipe line to the fore as a transportation medium

Fig. 2—Sequence of fabricating operations from edge trimming to finish end facing

Fig. 3—Skelp for 24-in. pipe going through edge trimmer and flattening rolls

Fig. 4—Two 3000-ton presses handle crimping and U-ing while closing to circular section is done on 11,000-ton press at rear. Note special design of presses with multiple hydraulic cylinders



SW SW 1 2 3 SE
1 2 3 4
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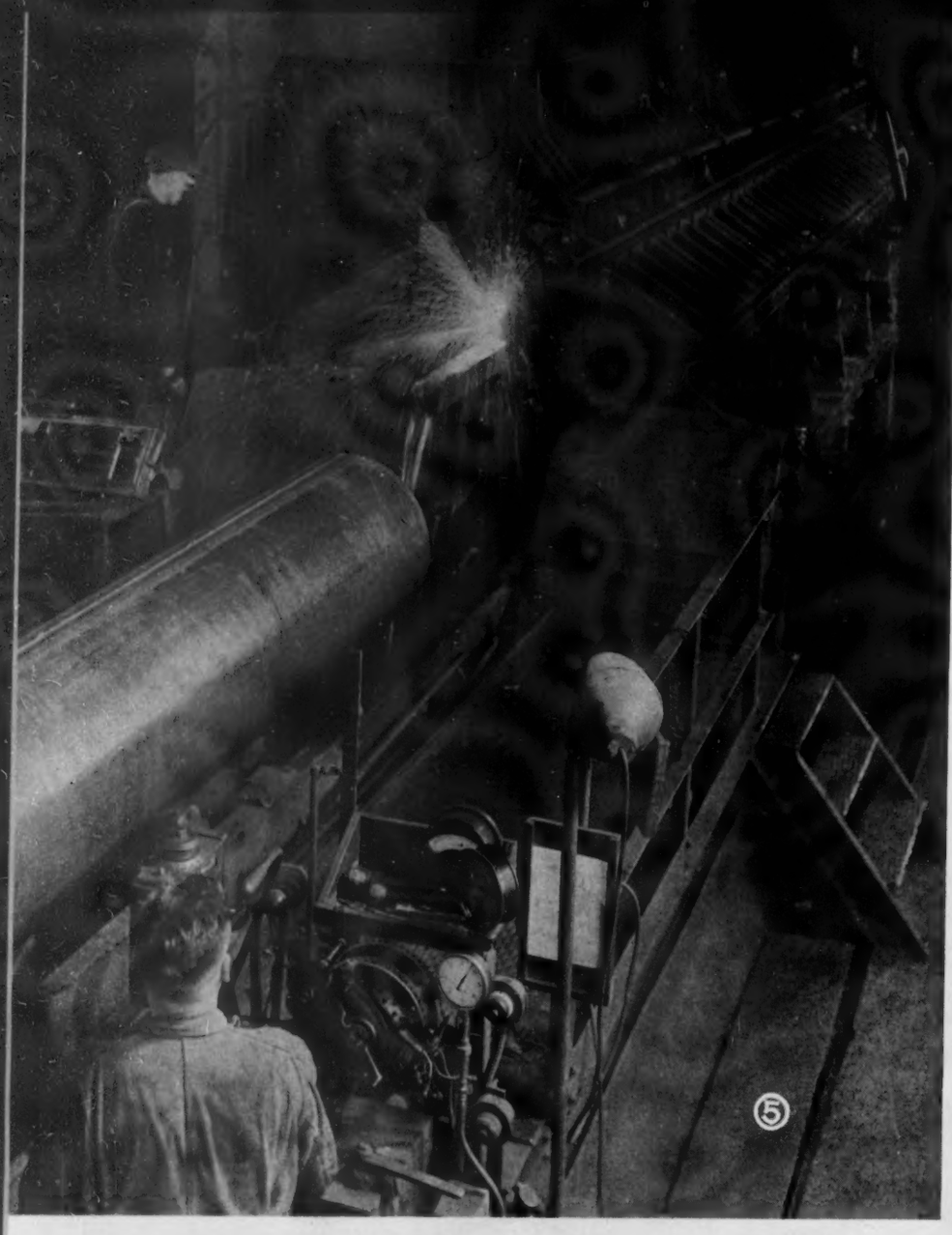


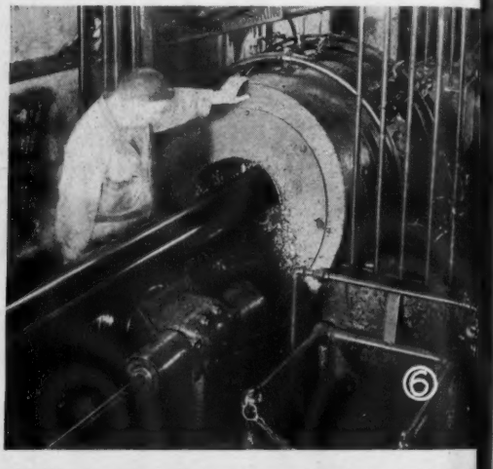
Fig. 5—One of three million-dollar, million-ampere flash welders capable of making a 40-ft seam weld at one step

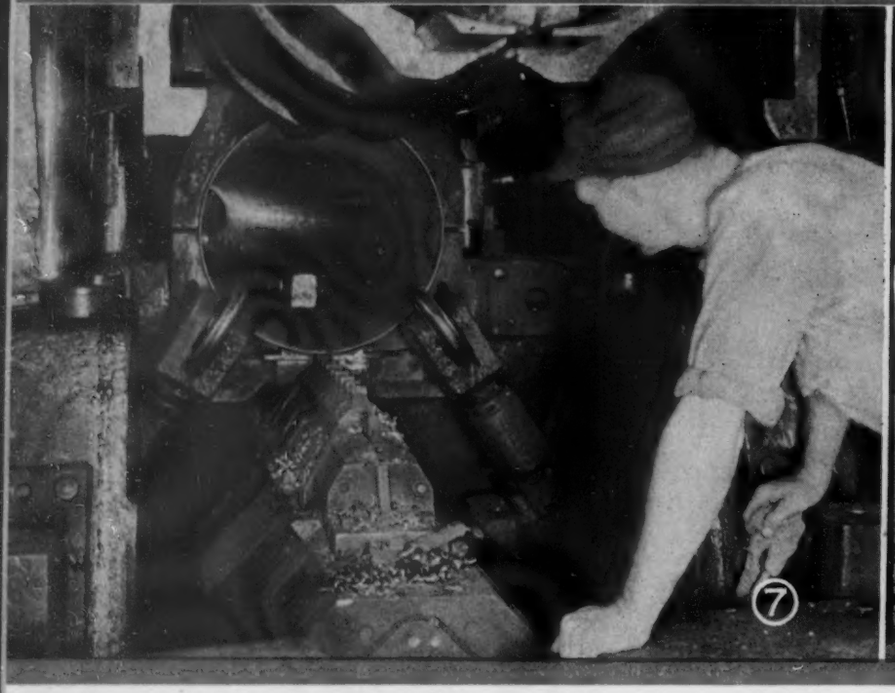
Fig. 6—Automatic painting machine applies priming coat to inside of pipe

Fig. 7—Welding flash inside and out is trimmed off here as pipe is gripped in close-fitting dies. There are five of these machines

Fig. 8—Special machine end faces both ends of pipe simultaneously

Fig. 9—Internal sizing machines stress every length of pipe beyond its yield point, increasing strength by cold working and also thoroughly proving the weld





the industry. Electric resistance butt or flash welding is employed to make the longitudinal seam as no other method produces equally reliable, satisfactory and economical results, according to this company's experience.

Rolled steel offers many advantages of value to the pipe line builder and operator. Both inside and outside surfaces have the desirable *smoothness and density* typical of rolling. *Both surfaces can be inspected* easily for the full length *before* manufacture into pipe. *Uniform thickness* is another important characteristic of rolled plates. *Thin-walled* pipe is also produced as readily as heavier wall since skelp can be rolled in any practical thickness with equal facility, thus offering considerable savings in steel in many instances.

As one of the larger consumers of rolled steel in this country, A. O. Smith Corp. purchases steel to its own rigid specifications, assuring uniform quality and correct chemical and physical properties for the contemplated service.

The pipe is made of steel in the low-carbon range (0.20-0.30 per cent), which is readily produced in uniform quality. During manufacture of the pipe, the desired higher strength characteristics are imparted by mechanical means. In other words, the steel in the pipe is *cold worked* as will be explained. The process is so designed that physical properties of the finished pipe will meet the specified requirements.

Pipe is produced in *uniform lengths* of 40 ft. Thereby fewer joints in the line are necessary; pipe laying is simplified; and corresponding savings are effected all the way from the shipping and handling to the laying and joining of the pipe in the line.

Let's make a tour through the company's pipe mill and see how line pipe is produced.

Outside the modern building, a magnetic crane is busily unloading stacks of 40-ft skelp from a string of gondola cars. Shuttling back and forth between the cars and a conveyor entering the building, it maintains a steady flow of steel for the production line. At the unloading end of the conveyor, there is located the pickling room.

Here the skelp is stacked in a special acid-resisting rack, care being taken to hold the sheets apart with acid-resisting separators. The whole package is picked up by a crane and submerged in the first vat containing hot sulphuric acid. An inhibitor is added in such proportion that the action of the acid is stopped at a predetermined point.

After 15 min it is given a water rinse in a second vat, whereupon it is dipped into a third vat containing an alkali solution to neutralize any remaining acid. Then it is again rinsed and finally emerges, freed of mill scale, rust, dirt and any other foreign matter.

Each piece of skelp is now carefully examined over the entire surface, even though a similar examination was conducted by A. O. Smith resident inspectors at the steel mills. Plant production laboratories also conduct a series of chemical and physical check tests on coupons from every heat of steel.

Placed on a live conveyor by magnetic cranes, the O.K.'d skelp is fed continuously through a scarfing machine and flattening rolls. Fig. 3 shows this machine. Work emerges with both edges trimmed to assure uniform and accurate width, and at the same time, shaped properly for welding. In a continuous stream, the skelp travels on toward the press line.

A magnetic crane places the skelp, one at a time, on the feeder for the first hydraulic press of 3000 tons capacity. Here it is shaped into a broad letter "U"—the first of three steps to convert the flat steel plate into a tube. See Fig. 2. It is rapidly transferred to the second press of like capacity, where it is formed into an approximate pear shape. Then it is taken to the third press of 11,000 tons capacity, where the shape is changed to a roughly tubular section. Presses are shown in Fig. 4.

Tubes are then moved by live conveyors, controlled from a central keyboard, to a row of giant welding machines.

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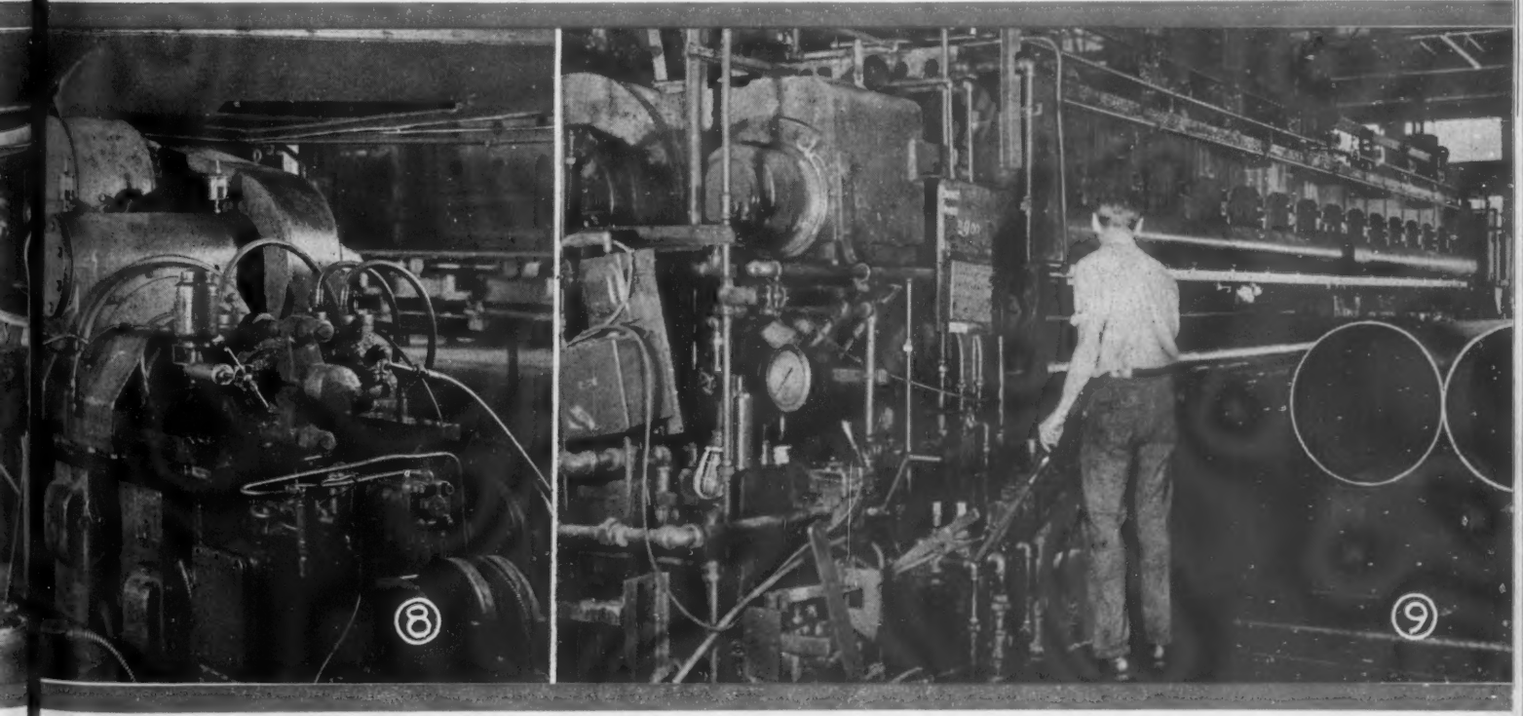

Designing WELDED

By GEORGE L. SNYDER
Chief Engineer
Lakewood Products Division
Kelsey-Hayes Wheel Co.
Detroit, Mich.

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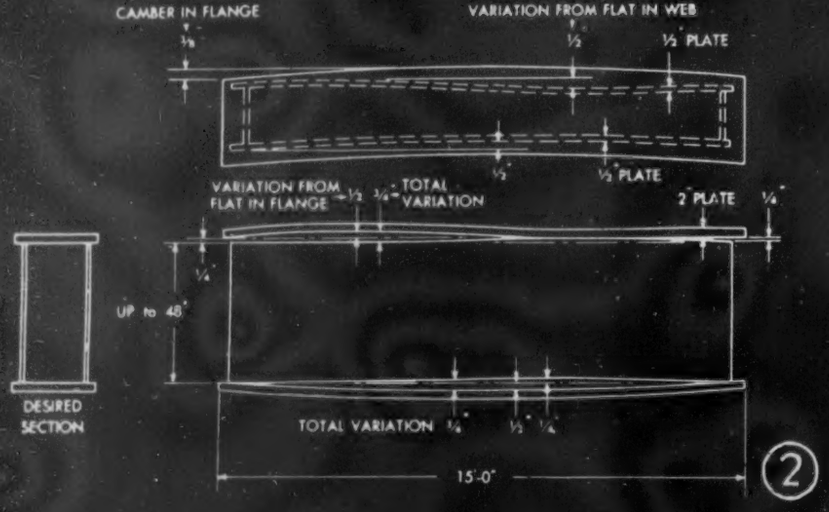

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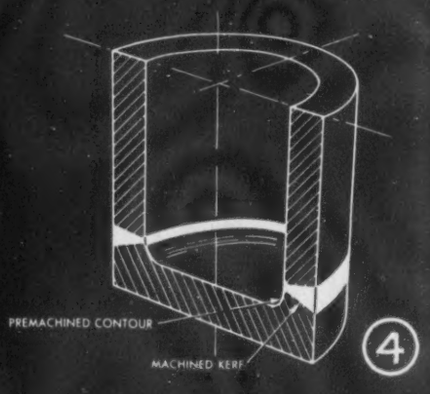

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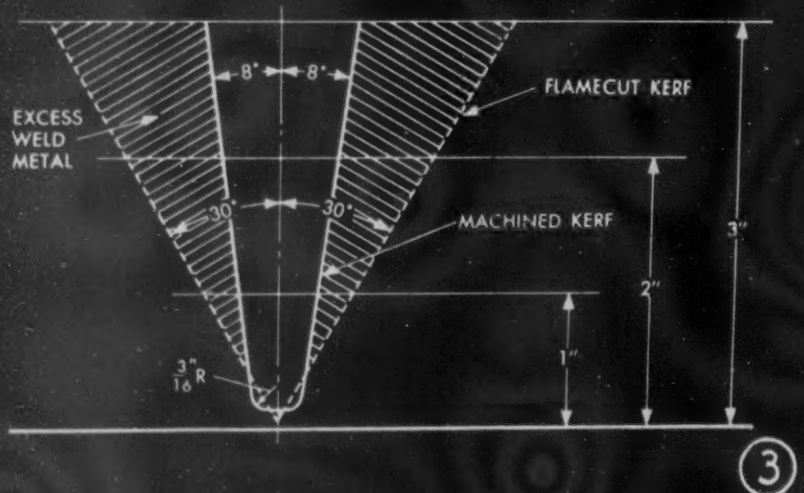

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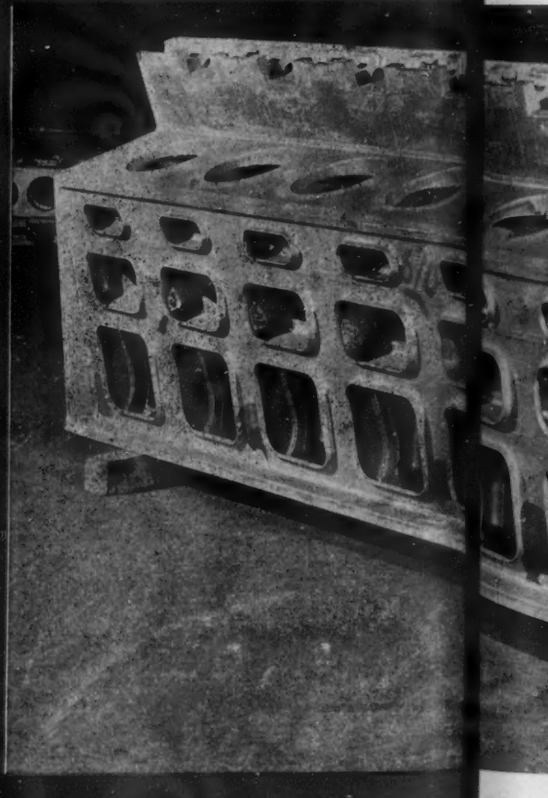

Basic considerations of design in developing dynamically loaded welded machinery parts are discussed from the standpoint of efficiently utilizing space and weight. When observed collectively, necessary understanding of the true relationship between single elementary factors is gained

MACHINERY PARTS

BASIC considerations for the designer in developing weldments brought out in this discussion may seem elementary and self-evident, but when considered collectively in developing a weldment, their complexity becomes apparent.

At least 12 different types of components can be utilized by a designer in his weldment and each of these components can be used in several ways. Consequently, the designer must be familiar with limitations in processing weldments and with the scope and limitation of equipment and methods used in their production. However, this article is limited to dynamically loaded welded machinery parts. Statically loaded welded structures present another broad subject and their design concept is decidedly different from that of dynamically loaded structures.

To begin with, hot rolled steel plate, a basic element, probably is the most universal component used in such structures.

Undoubtedly the freedom offered by the many sizing and shaping possibilities of hot rolled steel plate has much to do with its widespread use as a weldment component. As a basically flexible raw material from the standpoint of dimensions, hot rolled plate is obtained in variable sizes to 195 in. wide or to 25 in. thick.

Shearing usually is the most economical method of sizing or shaping a plate to rectangular or circular dimensions. When a plate is to be sheared to size, the designer should keep in mind the existence of shear droop which is the abrupt break in flatness that occurs around the sheared edge. Localized stresses imposed by the shearing pressure exceed the elastic limit of the material. Since this effect is confined to the area adjacent to the edge, it can be practically disregarded when the component is subjected to subsequent trimming or when it is in light gages, ¾-in. and under.

Flame-Cutting A Common Shaping Method

Flame-cutting, undoubtedly, is the most common method of shaping and sizing weldment components, particularly when the number of duplicate weldments required is small. Probably a big reason for this is the fact that many components of weldments necessarily are irregular in shape.

Since regular configuration generally is cheaper, the designer should think in such terms where possible. However, he need not be concerned if an edge is sheared or flame-cut as long as he designs the part so the supplier is free to use either method or both on a particular component. Fig. 1 shows a component produced entirely by flame-cutting.

Of course, in addition to shaping and sizing, the cutting torch also makes welding chamfers, or kerfs, on the edges of a component which provides the "grooves" for welds, other than plain fillets, when assembled with adjoining components.

Tolerance on components, disregarding method used in producing them, merits careful consideration by the designer of weldments for an accumulation of tolerances can cause costly difficulty in fabrication, as is shown in Fig. 2. This illustration pictures a highly improbable coincidence

Fig. 1—Component flame-cut to shape from hot rolled steel plate

Fig. 2—Box beam showing results of camber and flatness tolerances, as described

Fig. 3—Comparison between U and Vee welding kerfs

Fig. 4—Bottom of hydraulic cylinder, typical of those used in hydraulic presses

Fig. 5—A 16-cylinder Vee-type welded diesel engine frame requiring many flame-cut, formed and welded parts

of tolerance accumulation. Nevertheless it could occur within the limits of necessary commercial tolerances on flatness and straightness.

Tolerances are important considerations of flatness and straightness, particularly if fabricator's facilities for performing such operations cannot be operated so cheaply as those of the supplier of components.

Often, it is advantageous to size components on machine tools, if only for the reason that much closer tolerances are obtainable. For a complicated assembly with much welding on it, prefabrication machining is indicated. Also, at times, machining of components will help achieve close tolerance on a complete weldment. The more generous are tolerances on components, the more prevalent the gaps in fitting. Gaps require deposition of a greater amount of weld metal thereby increasing costs and destroying metal-to-metal contact which resists tendencies to shrink or warp.

Main structural parts of the weldment shown in Fig. 5 are premachined. Since this item is one of mass production, individual peculiarities in each weldment caused by the non-uniform accumulation of component tolerances could not be allowed.

Design May Dictate Pre-Assembly Machining

Sometimes design considerations dictate prefabrication machining as in the case of the joint between the heavy web and flange, shown at the right in Fig. 7. This might be a detail of construction on the bed of a large hydraulic or mechanical press. The loading in the region of the compression flange of such machines is such that the joint detail shown at the left in Fig. 7 would be necessary if the edge of the web were not machined. When machined, the metal-to-metal bearing achieved withstands concentrated compression loads. Fillet welds as indicated in this illustration are adequate then for withstanding horizontal shear components in this region of the beam. Edging of such webs to a relatively close tolerance is a simple operation on a plate planer.

Another reason for prefabrication machining is the provision of economical welding kerfs in combination with good joint fit-up, particularly in welding thick plates. A kerf must provide sufficient width to clear the tip of the welding electrode to permit the depositing of weld metal at the root of the weld. For, as plate thickness increases, it is apparent that the amount of metal wasted in the angularity of V-shape flame-cut kerfs in contrast to the U-shaped ones, as shown in Fig. 3, becomes an important factor.

Prefabrication machining is necessary, too, in instances of conflicting tolerances in fitting of circular components within each other. Studies of minimum tolerances reveal that gaps between pieces so fitted are inevitable but machine fits reduce such gaps to a negligible point.

Prefabrication machining is necessary at times, also, for providing proper contours in highly stressed weldments or in those subject to fatigue. Fig. 4 shows such an instance in the bottom plate of a hydraulic cylinder premachined to provide proper curve contour at the corners. This sketch also illustrates an application of machined kerfs on thick plates.

Another method used frequently for shaping plate components is blanking or punching on a power press. This operation, which is simply shearing using knives of special shapes, can be justified, usually, only when quantities re-

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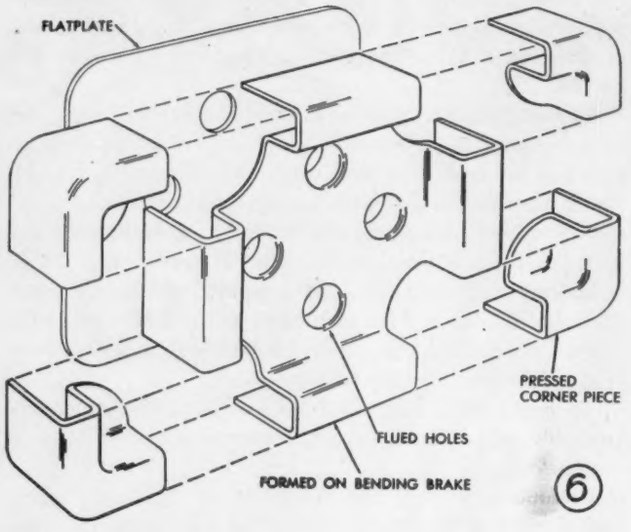
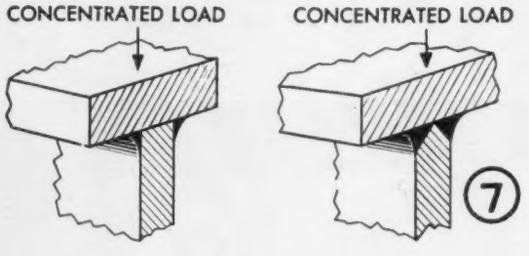




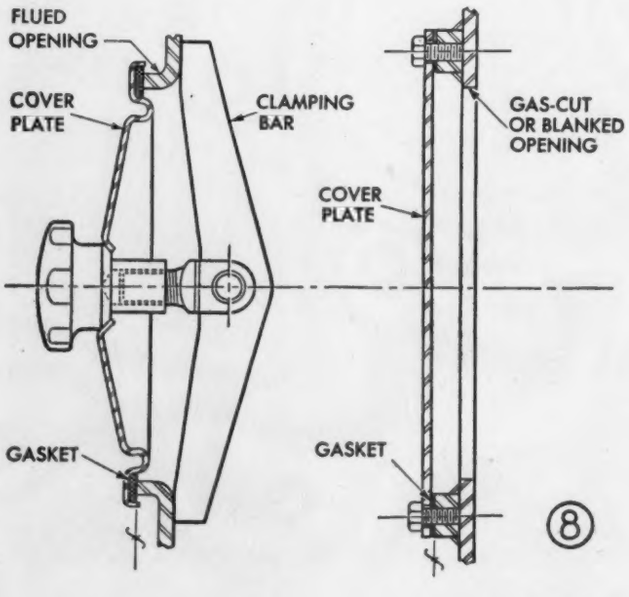


Fig. 6—(top) Corner stamping for water-cooled furnace door. (Bottom) Exploded view of water-cooled furnace door, showing detail of construction

Fig. 7—Joint between heavy flange and web, showing machined edge (at left) and full weld (at right)

Fig. 8—Formed seat cover designed to be fastened by an inner clamp (left). Assembly, welding and consequent warpage, and cost of drilled and tapped holes are eliminated (right)

Fig. 9—Weldment showing utilization of flued opening

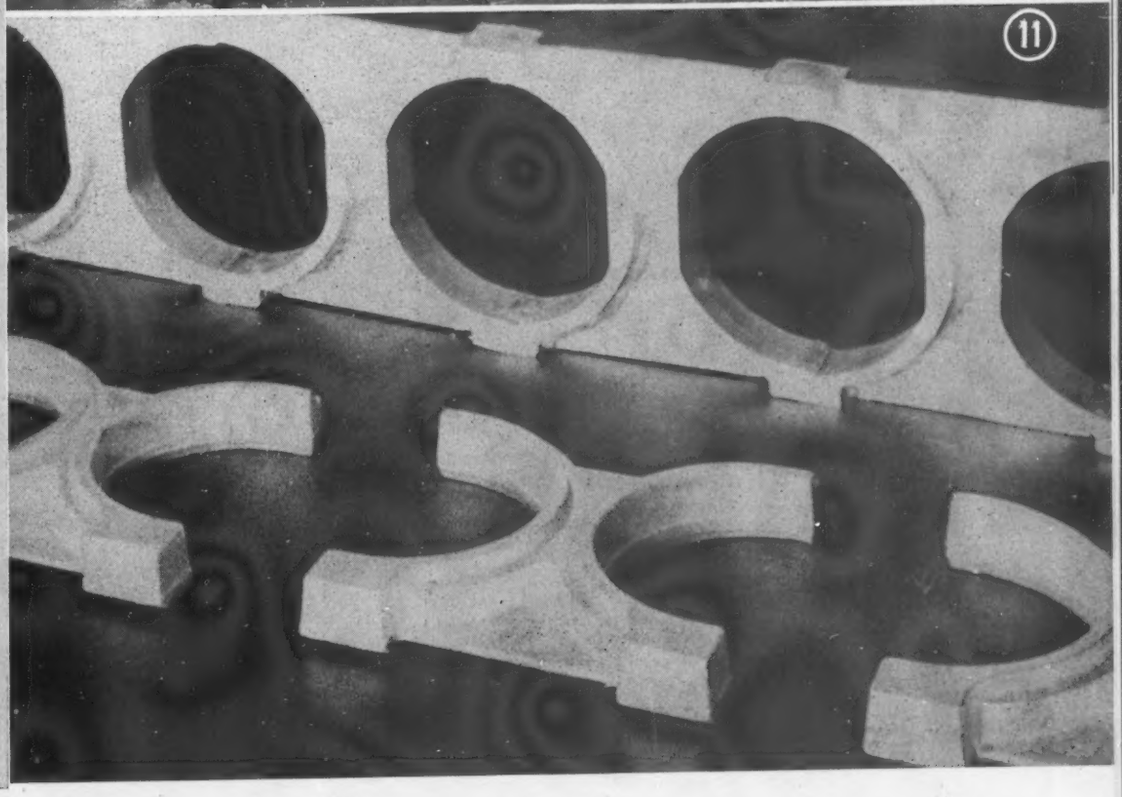


Fig. 10 — Plates, 4 in. thick, formed on bending roll

Fig. 11—Typical use of drop forgings and flash-welding to provide components of irregular shape and of different proportions

Critical phases of investment casting are found to be elimination of wax by heat, casting of molten metal and during solidification of metal. Concluding article points out factors which may determine success or failure in production operations

Fig. 9—Oven type furnace which eliminates wax and moisture from the mold. (Inset) Flask is removed from furnace
Fig. 10—General view of the Kerr burnout and casting research department
Fig. 11—Casting crucible containing molten metal being removed from furnaces
Fig. 12—Centrifugal casting machine, with flask being placed on top of crucible of molten metal

PRECISION CASTING PRACTICE

ELIMINATION of wax and moisture from the mold in precision casting by the "lost wax" process follows hardening of the investment about the wax pattern.

An oven-type furnace designed and built by Kerr Dental Mfg. Co., Detroit, for this purpose is shown in Fig. 9. Harry B. Lange of the Kerr staff states that one flask per minute can be handled by this equipment, thus permitting continuous production.

Flow of metal into mold is affected by temperature to which flask is heated, and degree of heat also will determine the thermal expansion of the investment. Invested flask is placed in furnace preheated to 200°F with its gate opening down so that liquefied wax is free to run out. Wax will run out before the moisture is completely eliminated, resulting in a cleaner mold. In inset at lower left, Fig. 9, flask is shown being removed from furnace after wax has been lost.

Pores of the investment must be "open" so that as the metal enters the mold the air being displaced will pass freely through the investment in every direction. The mold also must be completely free of wax after the burnout, and no deposit of carbon residue should remain in the pores of the investment.

Investments and Heat: Chemical or physical breakdown of the investing compound is a frequent reason for failure in preparing the mold for casting. As stated in the first article of this series (STEEL, Jan. 28, 1946), investment compounds usually are a combination of either quartz and plaster, or, as in the case of Kerr's own compound, a combination of cristobalite and plaster. Plaster (calcium sulphate, CaS_4) always serves as the binding agent. Cristobalite compound is recommended by Kerr as an investment only for nonferrous metals.

Chemical breakdown of these compounds usually can be attributed to one of two conditions. Breakdown will result from temperatures above 1400°F, or from prolonged burnout in a highly reducing atmosphere even at relatively low temperatures. Oxygen is removed from the calcium sulphate and, in either case, a sulphide is formed which has had a detrimental effect on metal cast into the mold. Kerr recommends that

(*Please turn to Page* 166)

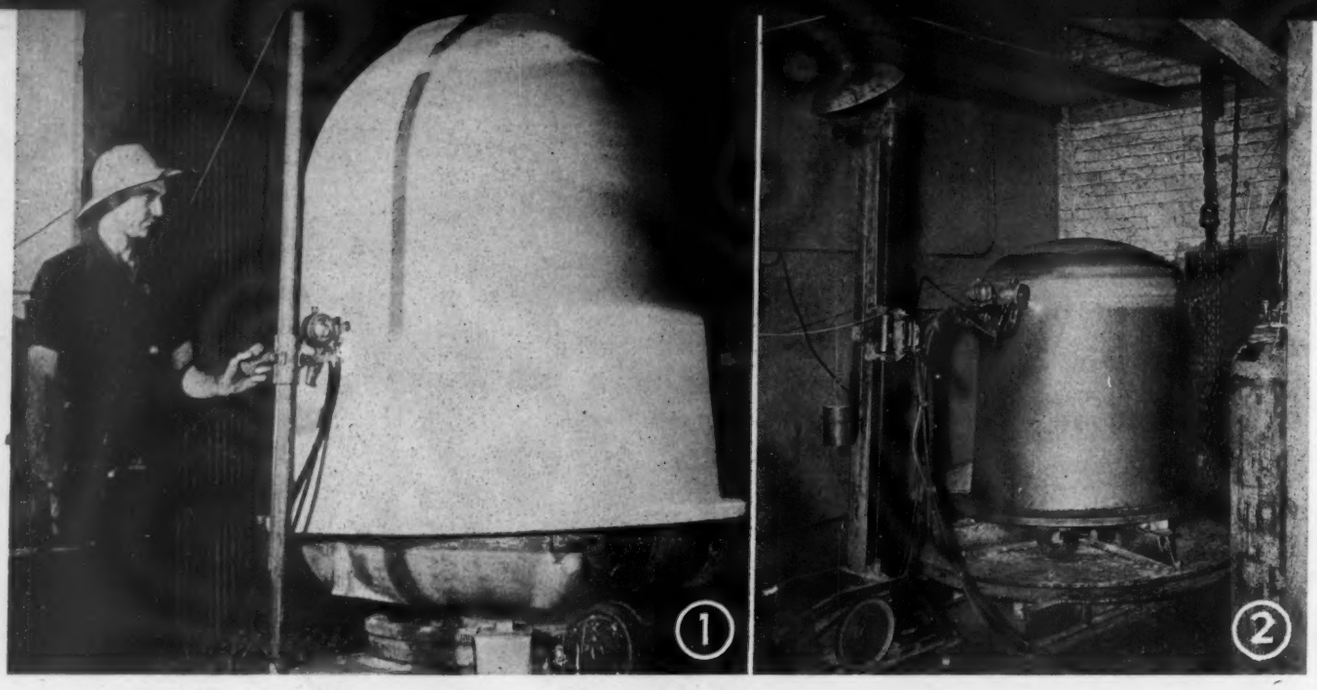


Fig. 1—Semiautomatic spraying of special chromium-nickel alloy to a thickness of approximately 0.015-in.

Fig. 2—Completely automatic metal spraying with two guns

Fig. 3—Appearance of pot after 2006 hr in furance at temperatures over 1000° F

Magnesium MELTING POTS

. . . MAINTAINED BY METAL SPRAYING

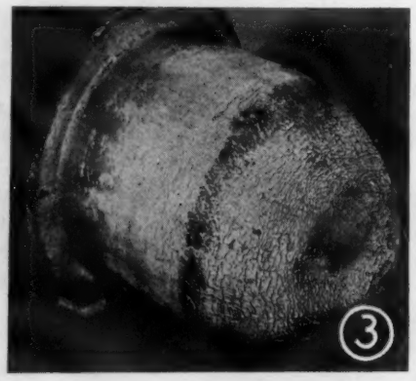
Process inhibiting scale formation on pot surfaces affords longer pot life and reduces explosion hazard

IN permanent mold casting, and particularly in production of magnesium parts, Permacast Division of Manhattan Modeling & Chasing Co., Paterson, N. J., gives primary consideration to the care and maintenance of melting pots used in its plant.

Dow Metal C alloy is used exclusively in these castings, although the pot care technique described is suitable for H and other magnesium alloys. The metal is melted in cast steel pots, each 2000 lb in weight, and holding 600 lb of magnesium per charge.

Pots, supplied by the Swedish Crucible Steel Corp., Detroit, are constructed from cast carbon steel of the following analysis: Carbon—0.35; manganese 0.70; silicon—0.60; phosphorus and sulphur—0.06; copper—less than 1 per cent, and nickel—less than 1 per cent. Cast iron pots are too porous to hold the flux used in melting magnesium, and must not be used.

Study of the industry's history indicates that most accidents are caused by lack of care in regard to melting pots. Danger is increased if a quantity of accumulated hot iron scale is present in the furnace pit. In such a case, an exothermic reaction will occur with explosive violence, spreading the burning molten magnesium over a wide area,



with consequent danger to property and employes.

Melting pots are located in furnace settings designed, built and erected by the company. Each furnace is fired by four gas burners in sets of two, arranged to give a swirling, circulating, tangential flame without direct impingement on the pot surface. Before a new pot is put into use, the original residual stresses remaining in the pot after casting are normalized or relieved by "stress relief" treatment whereby the empty pot is heated in the furnace settings to 1000° F, held for about 1 hr per inch of maximum wall thickness, and cooled very slowly to room temperature.

Causes of Short Pot Life: Chief deterrent to pot life, and factor controlling pot economy, is formation of scale on pot surfaces in contact with heating flame. Scale is caused by products of combustion of burning gases reacting with metallic constituents of pot. This corrosion or scale occurs after more or less prolonged firing on iron or steel melting pots. It is variable in composition, and results from chemical action. Furthermore, firing temperature and stresses set up in the pot cause gradually increasing surface plastic deformation of the metal, occurring at temperatures above 1500° F under a more or less constant load. Unfortunately, very few determinations of this creep factor

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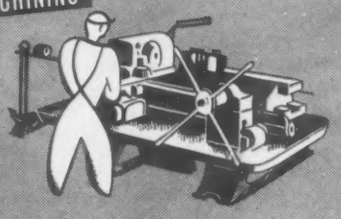
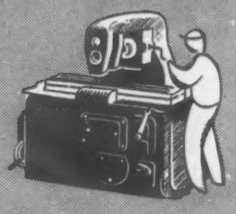
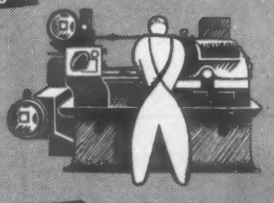


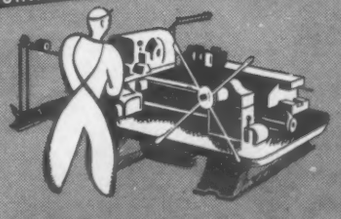
MILLING



THREADING

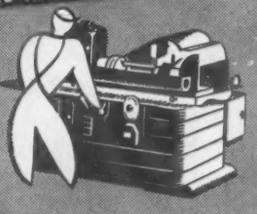


FINISH MACHINING

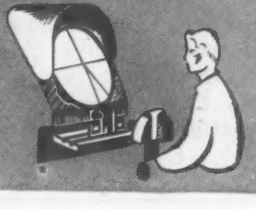


HEAT TREATMENT

FINAL GRINDING AND LAPPING



INSPECTION



under firing have been made available.

To increase resistance to creep 0.70 per cent, manganese is alloyed with the steel used in these pots. Nickel is not suitable because of its affinity for magnesium. This is unfortunate, as nickel offers extremely good resistance at high temperature to creep and oxidation.

Yield, hardness and fatigue strength also are gradually reduced, but may be overlooked as they are more or less linear to the very low values obtained near the melting point of steel. Steel tends to become brittle at continued low temperatures, this condition being due to graphitization and to the diffusion of corrosive chemical agents from, and chemical combination with, the products of combustion.

Carbon, particularly, diffuses into the surface layer and in its reaction with the steel, causes checks to develop, and is especially prominent where exterior casting irregularities form local points of heat concentration. As stress and movement occur especially during cooling, the built-up oxide flakes off into the furnace pit, causing a gradual decrease in thickness of the middle and lower sections of the pot. This accumulated scale tremendously increases the explosion hazard should burning magnesium and scale come together.

Nature of Scale: Pot scale is a complex and variable substance composed mainly of the chemical combination of iron and oxygen throughout, with which is incorporated mixtures of iron and other metallic constituents, plus various gases. Some sulphur also is present, and from it results ferric sulphates which also accelerate corrosion. The carbon content of the pot steel is in the form of carbides as Fe_3C, and minute quantities of carbides of the alloying constituents. The carbides do not combine with additional carbon until a furnace temperature of about 1350° F is reached, and the higher this temperature, the more rapid the formation, and the deeper the penetration.

What Causes Scale: Furnace gases (using city gas) liberate products of combustion which are responsible for scale formation, and rate in the following order of effect:

Gases liberating oxygen at elevated temperatures, and water vapor (H_2O), of which considerable quantities result when starting a furnace cold or after a period of inactivity.

Gases liberating carbon dioxide.

The water vapor mentioned which liberates hydrogen.

The two most important resulting gases are carbon monoxide and methane. Any concentration in the melting furnace atmosphere of more than 0.50 per cent hydrogen, or 0.75 per cent carbon monoxide at 1500° F, will promote excessive carbide formation. Carbon monoxide or carbon dioxide give oxidizing or reducing effect, dependent upon temperature.

How Scale Forms: Mechanism of scale formation is probably a part penetration of oxygen and hydrogen into the metal surface, and part migration of the inherent carbides of the steel to the heated surface, chemically combining with the iron, carbides and gases, with subsequent precipitation to form oxides.

A certain amount of calcium and silica, released from the furnace lining as dust, will combine as CaO plus SiO_2 = $CaSiO_3$ minus calcium silicate slag. Furnace setting temperatures are in the region of 2700° F. At about 2400° F, CO_2 plus Fe = FeO plus CO, causing the formation of iron oxide with season or corrosion cracking.

Generally, city gas up to 6 per cent CO content, at a furnace temperature of 2000° F or more, requires between 70 and 80 per cent of air for proper combustion, and will produce rapid scaling. A CO concentration of 12 per cent or more would be necessary to reduce scaling effect, but this is above the practical limit produced by the average burner adjustment.

Pot Defects Speed Failure: Scale represents a severe loss of metal, and is further objectionable because of its heat insulating property. It is generally noted that the scaling effect is more pronounced in a circumferential than in a longitudinal direction, and the detrimental effect is greatly increased if the pot exterior in the "as cast" condition is rough, or has protrusions resulting from careless riser cut off. These will form local stress concentrations.

Other defects on pots—as received—may be blowholes, minute cracks, lamination, sand inclusions, and general casting roughness. The worst condition is a line of weakness transverse to the direction of maximum tension stress. If such a condition exists, failure in service is inevitable.

During the years of war production, there were no fires or accidents in the magnesium melting and casting department at Manhattan. Rigid inspection, good housekeeping and metallizing were credited for this record.

Metallizing Procedure: Each melting pot exterior surface is metallized with a

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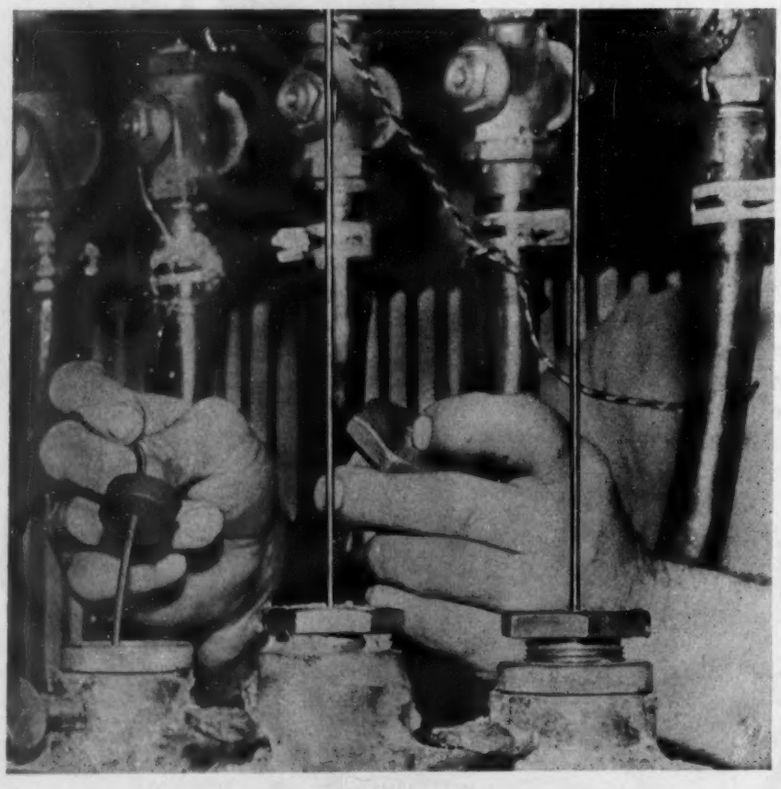

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SCRAP-HANDLING MAGNET

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INCREASED efficiency and durability of a scrap-handling magnet was made possible by using arc welding in its fabrication. J. S. McKeighan, welding engineer, Lincoln Electric Co., Cleveland, reports that formerly the efficiency and life of the unit was reduced because air gaps developed at the juncture of the parts. This condition not only reduced the lifting capacity of the magnet but permitted foreign matter and rust to accumulate in the gap between the shoes and thus prevent the desired close mating of the pole ring against the magnet housing.

On the recommendations of users, design engineers of Electric Controller & Mfg. Co., Cleveland, producers of industrial magnets, switch gear and other electrical devices, specified that a continuous weld be applied to join the outer ring and magnet housing as indicated in the sketch, Fig. 4.

In this case the two parts lent themselves ideally to welding, the cast housing of low-carbon steel effecting a snug fit with the outer pole shoe ring of wear-resistant and highly permeable steel. The parts were machined to form a suitable gap at the vee'd joint and first weld-sealed with 3/16-in. electrode. Two to three passes of mild steel electrode (AWS—E6012 and E6013) were then used to complete the weld. Sizes of the mild steel rod vary from 3/16 to 1/4-in. depending upon the size magnet being fabricated.

The finish welding procedure, utilizing a work mounting fixture to effect easy accessibility and most efficient downhand welding, is shown in Fig. 3. (Fixture consisted of a length of pipe with roller bearing on which the work is mounted so that it can be easily rotated

Fig. 1—Welding coil-case into the magnet housing along outer circumference. Inner circumference weld has been completed

Fig. 2—Fillet welding coil-cover to coil-case

Fig. 3—Welding operation to join housing and outer ring showing method of mounting work on shop fixture for efficient welding

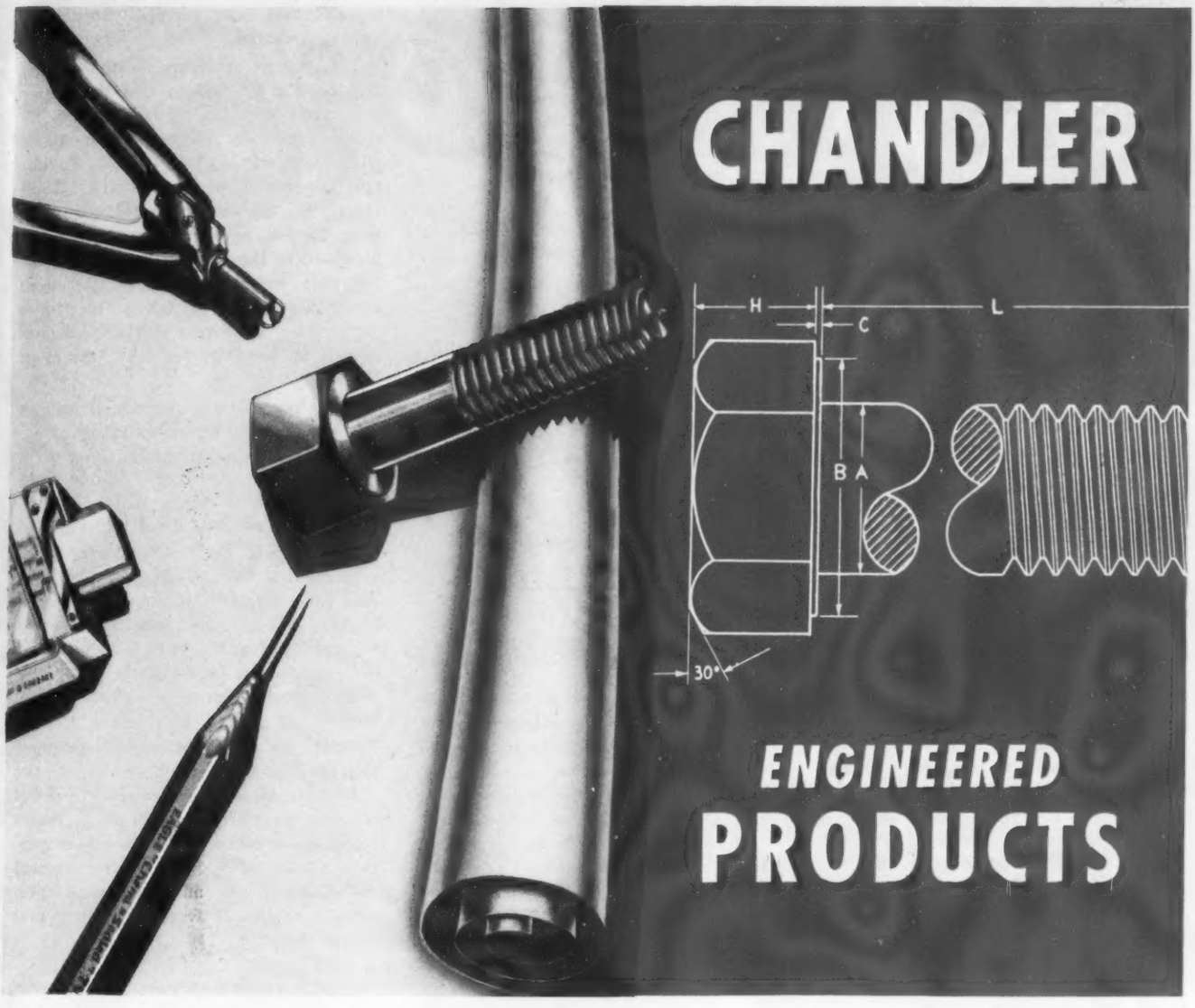

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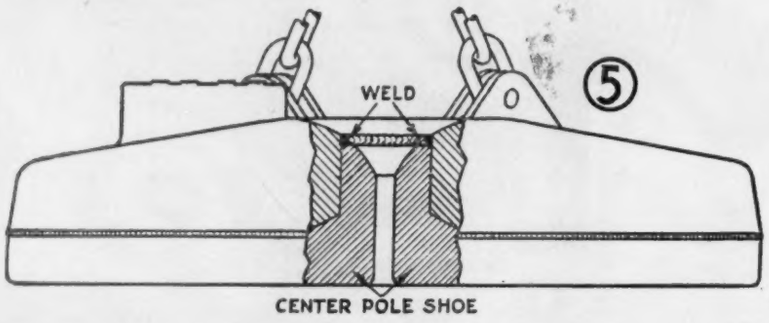
Fig. 4—Detail of magnet designed for welding of outer pole ring to housing

Fig. 5—Arrangement of design for welding center pole shoe to housing



as the welding progresses.) In applying the last bead, a weaving motion was employed thus effecting a greater deposition of weld metal to completely fill the joint.

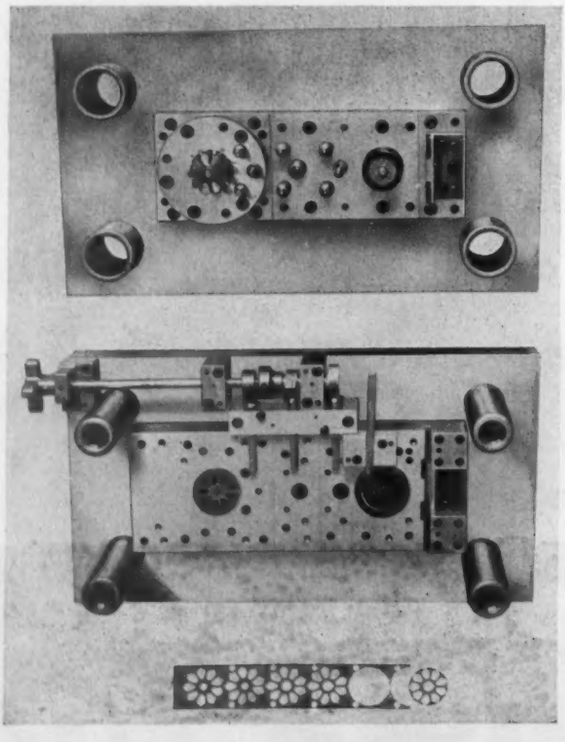
While this change in fabricating procedure was an advancement over the previous design, it did not fully solve the problem as the central pole shoe of the magnet was of a design which did not offer a satisfactory arrangement of joining by welding. A change in design of this part also posed a problem in retaining a design in which the housing would absorb the blows of impact against scrap-piles and preclude the possibility of shearing off the pole shoe entirely.

Here, freedom of design was employed to construct a central pole shoe with large cross-section and tapered sides. These sides fit tightly against the large machined surfaces of the magnet housing and thus offer adequate impact-absorbing qualities.

This design as shown in the sketch, Fig. 5, was effected so that the center pole shoe and the housing could be easily joined by electric arc methods with the work in flat position. To obtain good weld penetration and a solid union, the top of the center pole shoe was beveled at approximately 45° as indicated in the sketch. Here too, multiple pass welding technique was used to completely fill the joint and electrodes were of the same type and sizes as employed in welding the outer ring and housing.

Other parts of the redesigned magnet in which welding figures prominently include the coil case assembly. Component parts are first clamped into position with C clamps, intermittently welded at the joints, then finish welded with a continuous bead. Fig. 2 shows operator finishing the fillet welding of the coil-case cover to the coil case. After installing the coil-case unit into the inverted magnet housing, the work is weld-sealed with continuous beads at the inner and outer circumferences as illustrated in Fig. 1.

With the present arc-welded design of this circular scrap-handling magnet, the pole shoes are solid welded rings of metal offering increased strength and greater resistance to wear. All-welded construction permits sealing the magnet against moisture-entrance and insures a permanent contact between pole shoes and magnet-housing.



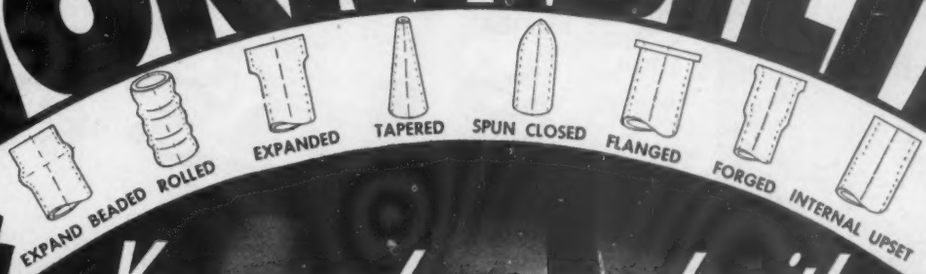
Carbide Lamination Die

A CARBIDE lamination die, designed and manufactured by New England Carbide Tool Co., Cambridge, Mass., for an electric motor manufacturer, is used for stamping rotor laminations for small electric motors. This is said to be the first time that carbide has been substituted for high speed steel in this type of die.

Silicon steel stock is approximately 0.014-in. thick and 1⅝-in. wide. Steps in operation consist of punching 9 teeth, 4 pilot holes, a combination shaft and key-seat opening, and cutting off. Solid carbide is used for all operations, including cutting off, and all pilot pins are made of solid carbide for sustaining accuracy. Carbide die shown in accompanying illustration has produced 500,000 laminations without being sharpened; therefore, life between sharpenings has not been established, but appears to be surprisingly long.

Carbide dies are said to be flat, without burrs, and lower in cost for this work. Original cost of carbide die is approximately four or five times that of a high speed steel die, but cost is believed to be justified through increased production of parts between sharpenings. It also has eliminated down-time on the press and need for stand-by dies.

WORKABILITY



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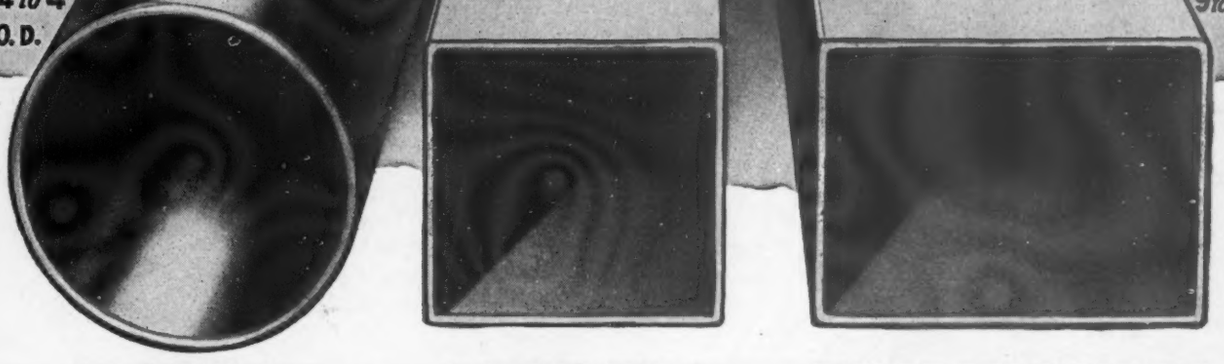

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By PAT DWYER
Engineering Editor
THE FOUNDRY
Cleveland

Employs Simple Rig for Making

BLAST FURNACE TUYERES

BLAST FURNACE tuyeres are made in several sizes and according to several designs. The casting forms the nose of the blowpipe which delivers air to the blast furnace and for that reason takes the form of a hollow shell through which water circulates. They are tested under water pressure before being placed in service, where their life is comparatively brief, exposed to the high temperature in the blast furnace. When the end springs a leak the tuyere is removed and replaced by another. Average wall thickness is ⅜ to ½-in. and average weight is 150 to 200 lb.

These tricky castings are made in several foundries in industrial centers with methods and equipment that are fairly

Fig. 1—Lowering core box onto jarring machine after drying plate with vent pipes has been properly placed

Fig. 2—Lowering cope section over jacket core. Note centering pins

Fig. 3—Placing dry sand jacket core over green sand center core. Tit cores are formed around threaded vent pipe.

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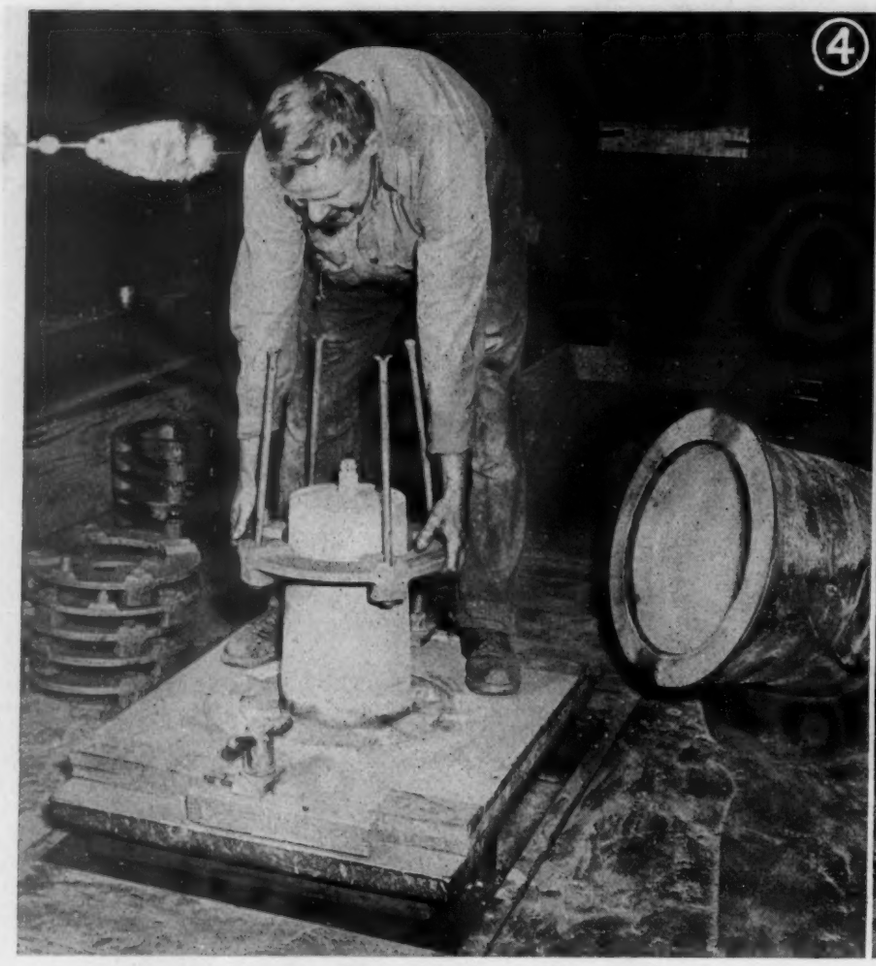


Fig. 4—Lowering core drying plate with vent pipes over center plug on jarring machine, Outer part of core box at right; core drying plates at left

Fig. 5—Drawing a crucible of molten bronze from coke-fired pit furnace

satisfactory. Some foundrymen insist on dry sand molds, while others stick by green sand. In some shops the casting is poured big-end-up, with the chamber core suspended from the cope or supported on chaplets in the bottom. In other places the entire pattern is molded in the cope, big-end-down, with the core resting on the water inlet cores and anchored with wires through the bottom board.

The rig employed in the foundry of the Bethlehem Steel Co., Bethlehem, Pa. represents the culmination of a long series of trials with practically every known method. It is eminently satisfactory in that it produces castings in a highly satisfactory manner, with a minimum amount of labor and with elimination of practically all hazard.

The casting is molded and poured big-end-down, with the entire body in a one-piece cast-iron flask that serves for both cope and cheek. The drag is one of the unique features of the equipment. It is a cast-iron plate ribbed on the bottom for strength, drilled on the face for core prints and equipped with a pair of stationary pins for guiding the cope into place. The face is machined to a true plane and carries a single small gate channel from a point near one corner to a point near the print for the center core.

Print Accurately Machined

This print, ¾-in. deep, is machined accurately with tapered sides to receive a small round plate on which the center core is rammed in an independent corebox. The corebox is provided with a similar print which insures that when the core is lifted from the box with a suitable center bolt and placed on the drag plate of the mold, it will be located accurately to give a uniform thickness of metal between the center core and the chamber core. This green core is made from a strong mixture of new and old sand and is provided with a 2-in. diameter vertical vent hole through the center and is not dried. The lifting bolt is unscrewed and removed after the core is in place.

Openings for the reception of the chamber core prints are drilled to a depth of 1 in. in the drag plate. A ⅝-in. hole in the center of each one is drilled the remainder of the distance through the plate. The corebox is placed on a small, flat-iron ring with pockets corresponding to openings in the plate. A ⅝-in. tube threaded at the lower end and pierced with numerous small vent holes is placed upright in each pocket, and then the corebox is filled with sand and jolted on a machine. The sand is a half-and-half mixture of coarse bank and silica sand bonded with powdered rosin. When the corebox is removed the iron ring remains on the bottom of the core and supports it while it is drying in the oven.

The dried core is removed from the ring and lowered into place around the center core on the drag plate. The prints guide it accurately into place and the threaded ends of the tubes project below the plate where they are secured with nuts. Everything is straight, true and tight, an absolute insurance against thin spots either on the inside or outside walls of the casting.

A stripping plate jolt machine is employed to ram the cope in a plain, square cast-iron flask with a single upright sprue in one corner. The cope is lifted from the machine by a small crane and lowered over the chamber core into place on

COPYRIGHT 1946 THE TIMKEN ROLLER BEARING CO.

— what comes next in gas turbines?

With *Super-Steel* available from The Timken Roller Bearing Company, will the aircraft industry now build its 10,000 horsepower dream engine? Are we going to have faster, super-smooth gas turbine-powered locomotives? Will gas turbines gain a wider usage for stationary power?

Some engineers think so!

Whatever comes from the designers of tomorrow's products, The Timken Company stands in a unique position to supply alloy steel needs. As a leading specialist for 30 years in both electric and open hearth alloys, its experience in difficult applications has not been equalled.

From this experience have come special techniques in melting, processing and working alloy steels.

From this experience, too, has come a vast store of metallurgical knowledge, invaluable to a customer in selecting specifications for his alloy steel requirements.

As routine service, our engineers go direct to the job. They analyze, check and prepare a recommendation for the most economical alloy, even if it means producing a tailor-made steel! If your company uses alloy steel, either bars or tubes, don't be content until you find out how Timken might improve it—and *save you money.* Write Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio. *Timken Bearings, Timken Alloy Steels and Seamless Tubes, Timken Removable Rock Bits.*

TIMKEN

Trade-mark Reg. U. S. Pat. Off.

Fine Alloy

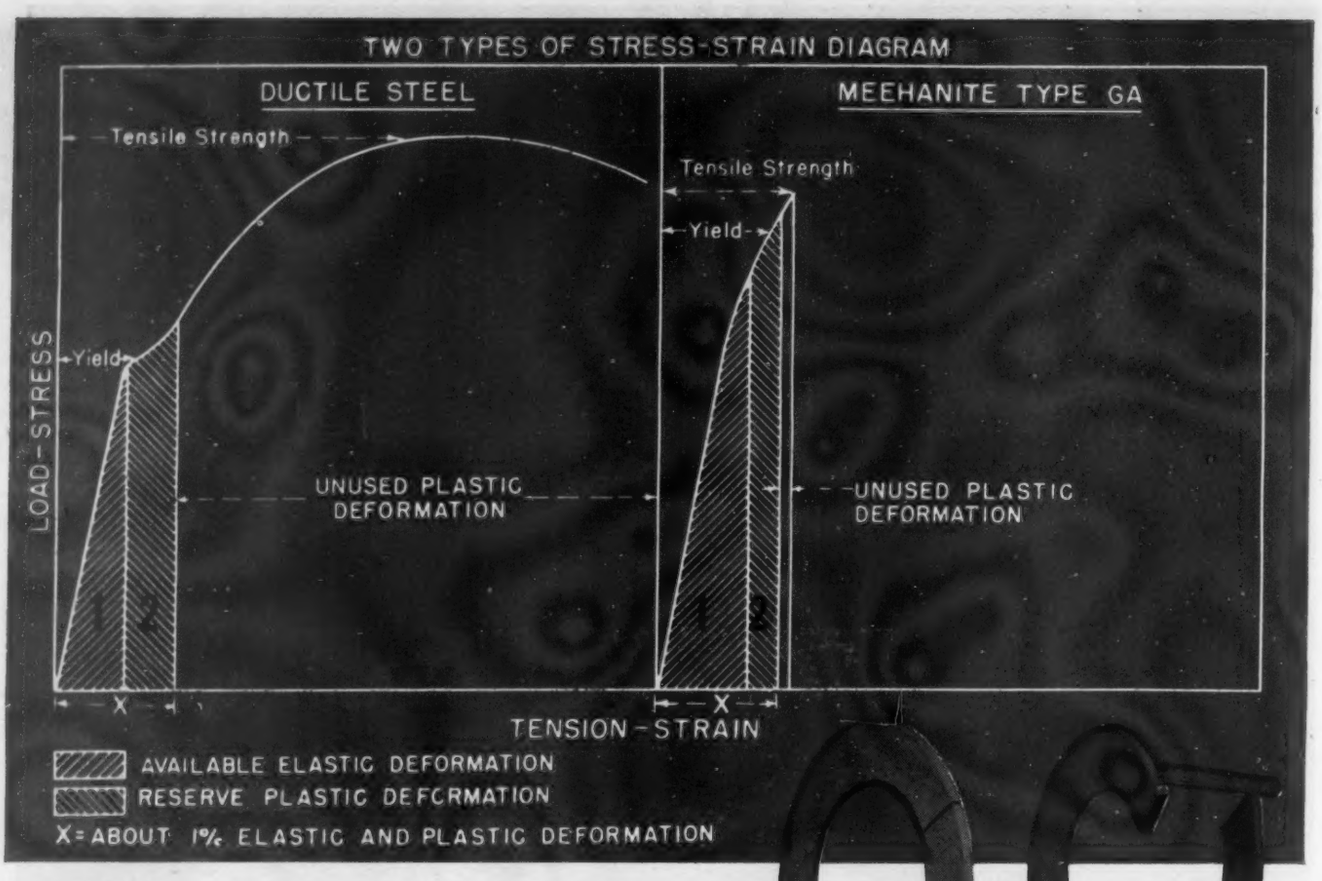
STEEL AND SEAMLESS TUBES

IN JET PROPULSION: It is so hot in the flaming heart of Lockheed's amazing jet propelled fighter—"The Shooting Star"—that ordinary steels would turn into white putty-like masses. Yet, in this terrific heat, a turbine wheel must revolve at a speed so utterly fantastic that if a small fragment broke loose, it would pierce eight inches of armor plate.

For long years, lack of a metal to withstand such conditions blocked the development of jet propulsion.

How metallurgists of The Timken Roller Bearing Company overcame years of failure in a few months; how they developed a proud and princely *Super-Steel* for this turbine wheel which met its fiery tests like a thoroughbred—that now is Air Force history.

★ YEARS AHEAD — THROUGH EXPERIENCE AND RESEARCH



MEEHANITE CASTINGS ARE TOUGH!

This 1" thick section was cut from a heavy Meehanite casting. It was possible to split the piece as shown 3½" before fracture.

FACTS, FIGURES, DATA, AVAILABLE AND RELIABLE FOR THE USERS OF MEEHANITE CASTINGS

In engineering design the ultimate breaking strength of any material is rarely used. Designers require safety in service, not failure. There is a considerable gap between the yield point and the ultimate strength.

The stress-strain diagrams plotted from a tensile test of mild steel and Type GA Meehanite appear as shown above.

Steel shows both a higher ultimate strength and elongation value than Meehanite. The important point, however, is how much of these values can be used in unit design.

The diagrams reveal three distinct areas:

1. *Stress absorbed during elastic deformation. This has relation to the Modulus and Yield strength.*
2. *Stress absorbed during elastic and plastic deformation which has some relation to the reserve of plasticity available against sudden fracture.*
3. *Plastic changes recording deformation during failure.*

Areas 1. and 2. illustrate in a general way, the relative capacity of both materials to absorb working stress in service up to approximately 1% plastic deformation, which is as much as any normal engineering construction can endure.

They show that to this extent Meehanite, despite its lower ductility, does have as large an area for plastic adjustment to distribution of the load as the so-called ductile metals.

This explains why Meehanite is finding wider engineering applications in structures normally calling for high elongation and reduction of area values.

MEEHANITE RESEARCH INSTITUTE
NEW ROCHELLE, N. Y.

the drag plate where it is held by two clamps. A row of drag plates is mounted on a permanent trestle elevated 18 in. above the floor for the convenience of the operator in attaching and disengaging the nuts which hold the chamber cores in place. The plates also remain permanently in place. The entire unit is the essence of simplicity and accuracy. After the casting is poured, casting, mold and core are removed as a unit. The plate then is blown clean with an air hose and made ready for the next assemblage of a tuyere mold.

Metal for the tuyeres, made up from a mixture of virgin copper and scrap tuyeres from the blast furnaces, is melted and poured from a ladle with a capacity for pouring four castings. Temperature of the metal has to be held within close limits. Experience has shown that where more than four tuyeres are poured from the same pot, the variation in temperature will cause the casting from the first and the last of the heat to leak under pressure.

Two openings in the large end of the casting are tapped and threaded for connection with the circulating water pipes. Two additional openings are formed for the double purpose of locating and anchoring the core properly, and of providing additional openings for the vent from the core. Later these extra openings are tapped and threaded for the reception of plugs that are screwed in tightly. The extra openings also facilitate removal of the sand forming the chamber core. The castings present an exceptionally clean, smooth skin, and with the exception of a little grinding require little time or labor in the cleaning and shipping room.

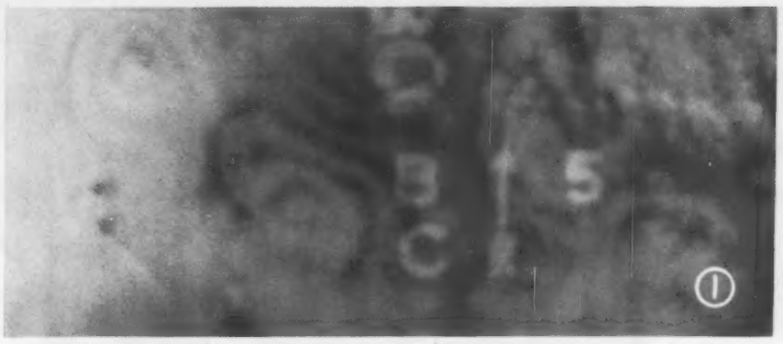
From the December 1945 issue of THE FOUNDRY.

Commercial Laws and Credit Information

Credit Manual of Commercial Laws, 1946, cloth, 759 pages, 6 x 9 inches, published by National Association of Credit Men, 1 Park Ave., New York 16, for $6.50.

This is the current annual issue of this manual, brought up to the first of the year, designed to provide accurate and authoritative information in regard to the subject matter covered. The effort has been to set forth fundamental principles and existing statutes in order that credit and business executives may have a convenient guide.

Main subjects covered are: Basic law of business; secured credits; legal phases of collections; insolvency; federal regulations; bonds on public work. Under each main head the subject is divided into various phases and each exhaustively discussed. An adequate index adds ease in finding desired material.



X-RAY in the STEEL FOUNDRY

Production increased one-third; annual savings on one item over $50,000

PRODUCTION at a steel foundry has been increased by one-third through installation of industrial x-ray equipment. Castings, ranging from 200 lb to 30 tons, include driving wheels, cylinder heads, cross heads, and large railroad engine frames. Industrial castings include electric motor housing, turbine spiders, pump cases for dams, high pressure vessels, and various other parts.

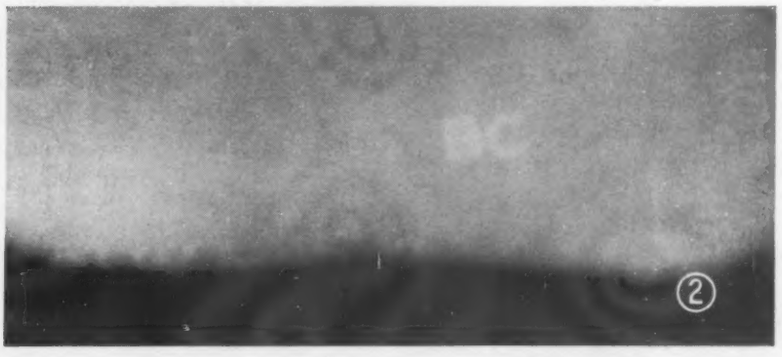
First x-ray unit at Union Steel Castings Division of Blaw-Knox Co., Pittsburgh, was a 220 kv machine installed in 1941. Usefulness of this unit led to installation of a million volt machine in 1943. Combined use of both outfits has increased acceptable melt to a total of 3000 tons of sound castings per month.

Plant procedure calls for x-ray inspection of pilot castings at many points in initial production. As many as 40 radiographs may be made of a single casting, depending on its size and intricacy. Radiographs such as those shown in Figs. 1 and 2 then are thoroughly examined for irregularities such as shrinkage, porosity and blowholes, and changes made in gates and risers to correct undesirable conditions. Fig. 1 shows how clearly these flaws are indicated on the film. Fig. 2, a sound casting, indicates that valuable hours of machining are justified to finish the piece.

All castings are examined in this manner until the technique is improved. The job then is released for production. One example of the savings made possible by this technique is found in the standard yearly output of 900 tons of a 700-lb electric motor housing. Before x-ray equipment was installed, about 25 per cent of these castings were rejected after an average of $82 of machining time had been wasted on each. Total annual savings effected by radiographic examination was well over $50,000.

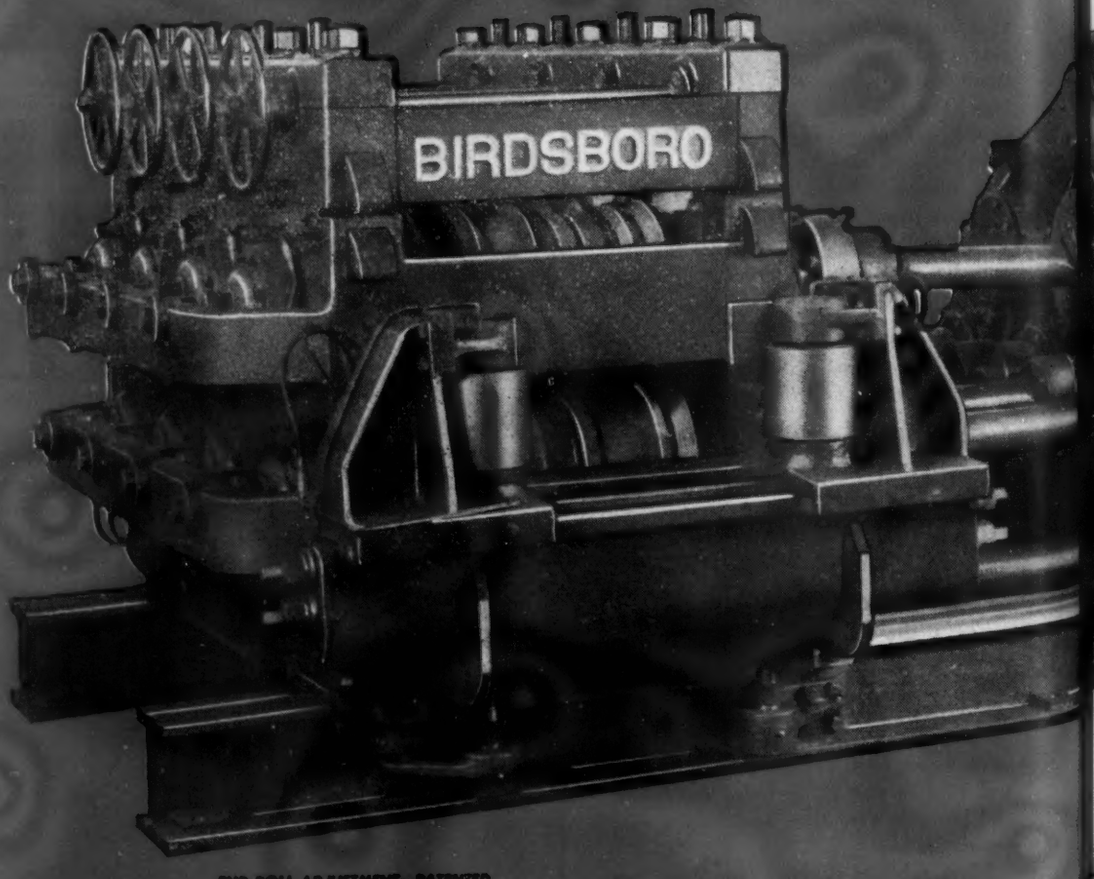
Those irregularities which do occur, even with careful control, are chipped out, the weld metal is filled with sound weld metal, and the part x-rayed again. Thus thousands of tons of sound castings are delivered every year.

All data and photographs courtesy Eastman Kodak Co., Rochester, N. Y.



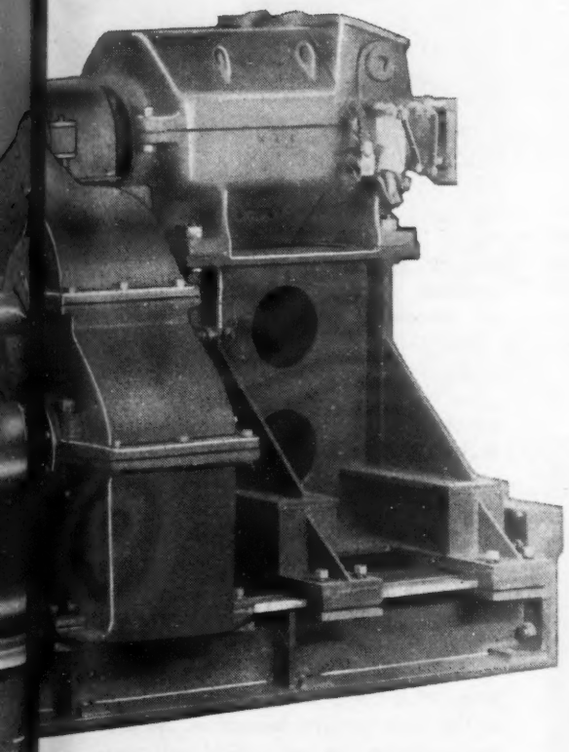
new

Designed with a



END ROLL ADJUSTMENT—PATENTED

"angle straightener by BIRDSBORO-
ye to speed and accuracy.



Here is the latest design in a machine of this type. Because of its patented end roll adjustment, the operator maintains quick and easy control of the rolls while the machine is in operation. This provides for speed in production and holding the work going through to close tolerances.

This machine has four bottom and four top working rolls and is also equipped with a set of vertical idler rolls. The four bottom rolls and one top roll on entry end of machine are driven through universal spindles. The straightening rolls are made up of discs mounted on steel mandrels. Anti-friction bearings are used throughout.

This is another example of the modern development work being done at Birdsboro—an activity you may well investigate when you are thinking of replacing worn-out equipment or adding to your plant facilities. Put your problem into the hands of Birdsboro design-engineers for a practical solution.

BIRDSBORO STEEL FOUNDRY AND MACHINE COMPANY, BIRDSBORO, PA.

Manufacturers of Steel Mill Equipment, Iron and Steel Rolls, Hydraulic Presses, Crushing Machinery, and Special Machinery

BIRDSBORO

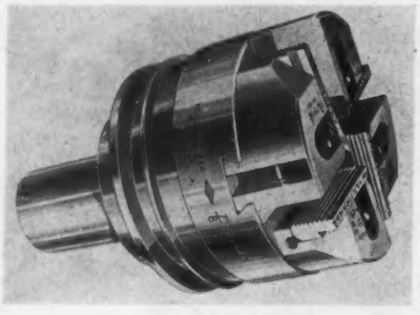
STEEL MILL EQUIPMENT

INDUSTRIAL EQUIPMENT

Die Head

Landis Machine Co., Waynesboro, Pa., announces an improved Landex hardened and ground die head for use on automatic and semi-automatic screw machines. The new type LL Landex head which supersedes the type L head has features which assure dependable service and greater thread accuracy.

Major improvement of the type LL Landex over the type L Landex head is use of latch blocks which take place of the locking ring in the type L head.



Latch block abutments are readily reground after they have become worn in service making a quick and economical means for repairing die head. Latch blocks in this head are positioned in adjusting ring. This is a decided advantage in that abutments contact the back face of the closing ring in latching head in closed position. As die head is adjusted for different diameters, latch blocks are continually using a different position on abutting surface of closing ring with result that wear of any appreciable amount is extended over a considerable length of time.

Type LL Landex head comprises four major parts whereas the type L Landex head had five major parts. Chaser holders for the type LL Landex heads are interchangeable with chaser holders employed with the other type head. Type LL Landex head is available in ⅝ and ⅞-in. sizes.

Steel 2/4/46; *Item No.* 9968

Industrial Oven

RS industrial ovens, in sizes from 2 x 2 x 3 ft to 4½ x 6 x 9 ft, are adaptable for all baking and drying processes up to 500° F, and speed baking by as much as 50 per cent. Manufactured by the Despatch Oven Co., Minneapolis, units are self-contained and require only lead-in of gas or electricity for complete installation.

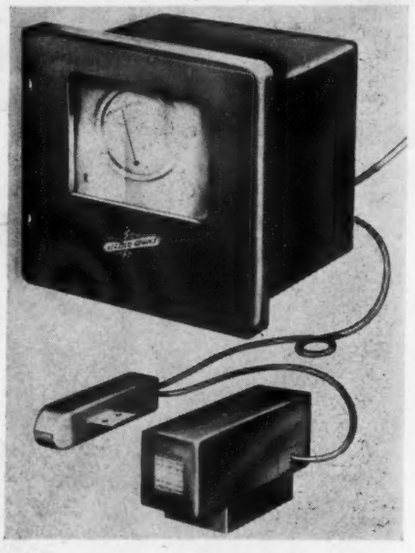
A special loading dolly and shelf arrangement permits easy loading and maximum use. Upright position also means easier loading plus floor space saving. Automatic controls and quick starting make oven adaptable from one type of operation to another.

These units are now used on radio and radar; coil and armature drying and baking; carbon brittlement and aluminum aging; baking a variety of synthetic finishes; japans; varnishes; lacquers; enamels; and all kinds of dehydrating and drying.

Steel 2/4/46; *Item No.* 9868

Electronic Counter

Lansing Engineering Co., 934-36 Clark street, Lansing, Mich., has just introduced a new electric counting device which may be attached to any type of production machine, including those for use in the metalworking, woodwork-



ing, textile, printing, baking, shoe manufacturing, canning, bottling, box making and confection industries.

The device, called the Electro-Count, permanently records the number of pieces produced on a machine throughout the working day, thus aiding in time studies and time keeping, estimating costs and the like.

In the large electronic control box shown in the illustration, power requirement may be adjusted. This box may be located near the machine or remotely. The machine counter, at the lower left, is located at the machine and records the number of parts or operation completed. The recording mechanism at the right may be located in the production superintendent's office and visualizes work progress minute-by-minute throughout the day.

Steel 2/4/46; *Item No.* 9051

High Speed Relay

The new Millisec relay introduced by Stevens Arnold Co., South Boston, Mass., is a hermetically sealed sensitive relay capable of speeds up to 1000 operations per second. Basic design of the moving elements is quite different from con-

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 156.)

The Perfect Mechanical Seal
for Centrifugal and Rotary Pumps –
Refrigeration Compressors – Gear Boxes –
Speed Reducers – Other Industrial Applications
Specify the
John Crane
Bellows-Type
Shaft Seal
A Precision Product of Crane Packing Company, Chicago
A B C D E F

Typical installation of the JOHN CRANE Bellows Shaft Seal. Arrows point out six outstanding features which are fully described below.

This **BULLETIN** *will answer Your* MECHANICAL SEAL QUESTIONS

DESIGN FEATURES

A. Tail of synthetic rubber bellows is preloaded on the shaft. Gives a positive, non-slipping drive.

B. Bellows head is flexible; adjusts automatically for washer wear and shaft end play.

C. Protecting ferrule prevents flexible bellows from adhering to shaft; assures free movement.

D. Sealing washer rotates with shaft; driven through metal parts—no torque on bellows.

E. Sealing faces both carefully lapped at our factory to insure a perfect seal.

F. Floating seat is cushioned in synthetic rubber sealing ring, eliminating stress distortion of sealing faces.

The JOHN CRANE Bellows Shaft Seal is being used with great success on centrifugal pumps, speed reducers, refrigeration compressors; all types of sealing applications. It is fully illustrated by the bulletin shown above.

The advantages this precision-built Shaft Seal has over packings are many. It reduces friction and saves power. Requires minimum attention over long periods of operation. *Completely eliminates* gland adjustment, stuffing box leakage and shaft wear.

With a JOHN CRANE Shaft Seal in your equipment, these advantages become important additional features to stress in competitive markets. Every manufacturer or Design Engineer who has a shaft sealing problem should see this bulletin. *It's informative—write for a copy!*

CRANE PACKING COMPANY

1879 CUYLER AVE. • CHICAGO 13, ILL.

BALTIMORE, BOSTON, BUFFALO, CLEVELAND, DALLAS, DETROIT, HOUSTON, LOS ANGELES, NEW ORLEANS, NEW YORK, PHILADELPHIA, PITTSBURGH, SAN FRANCISCO, ST. LOUIS, TULSA

CRANE PACKING CO., LTD., Hamilton, Ontario, Canada.
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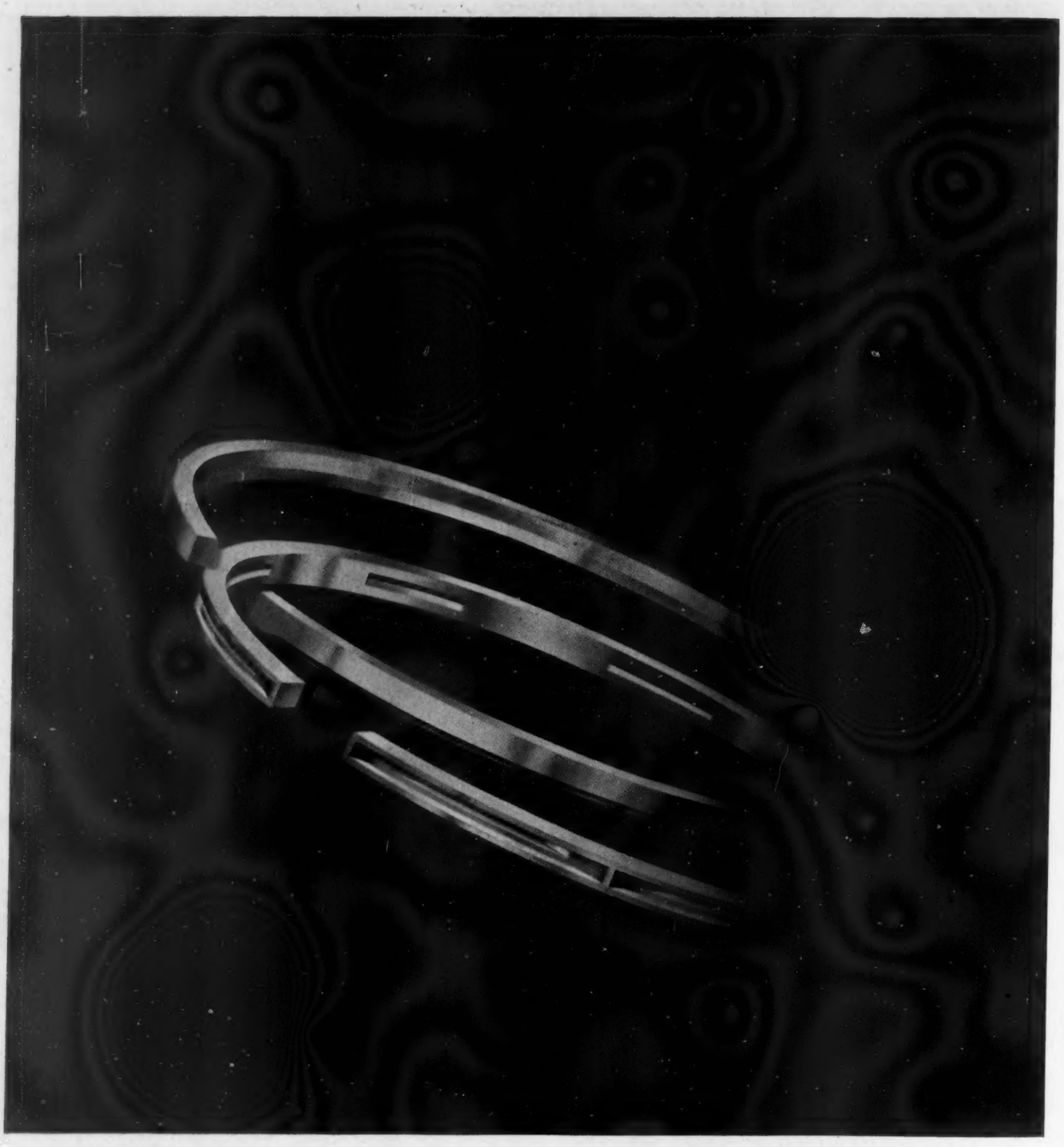


PORTRAIT OF PERFECTION

If it calls for precision handling, let McQUAY-NORRIS make it! Our knowledge of metals, our 35 years of experience in all phases of automotive precision-part making are the most versatile in the industry—and we love *tough* ones! Inquiries are welcome from any industry with peacetime plans.

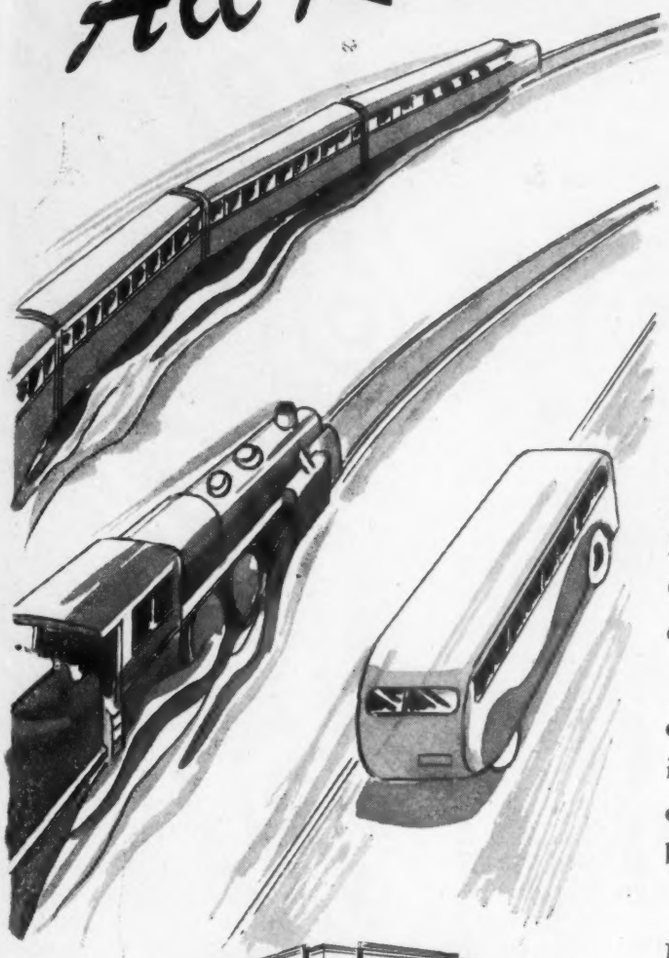
TIME TESTED McQUAY NORRIS AUTO PARTS PROVED IN SERVICE

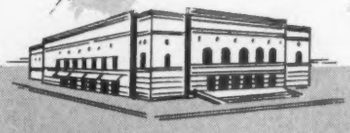
FOR INGENUITY IN PRECISION ENGINEERING . . . IT'S

McQUAY-NORRIS
MANUFACTURING COMPANY
ST. LOUIS, MO. . . TORONTO, ONT.

PRECISION WORKERS IN IRON, STEEL, ALUMINUM, BRONZE, MAGNESIUM

All Roads Lead to the METAL SHOW





NATIONAL METAL CONGRESS AND EXPOSITION

FEBRUARY 4TH THRU 8TH

CLEVELAND'S PUBLIC AUDITORIUM

See 450 Industrial Exhibits . . . Hear Hundreds of Production Discussions

Come to Cleveland this week and meet with thousands of fellow metal men at the 27th National Metal Congress and Exposition. From Monday, February 4, through Friday, February 8, Cleveland Public Auditorium will be headquarters for America's metal industry.

For your convenient inspection, 450 firms will concentrate their latest production developments in this great Metal Show; more than eight acres of space will be occupied; a thousand experts will be on hand to consult with you.

And running during the same week at the Metal Congress will be nearly a hundred technical and practical sessions covering all the important aspects of metals, their production, fabrication and use. These sessions will include technical research papers, practical round-table discussions, and educational lectures.

You will have a good week, a busy, interesting and helpful week in Cleveland at the Metal Show. You will see new machines in operation; hear many timely discussions; talk to many of your old friends — and make many new ones.

So take the road that leads to Cleveland and attend the first and greatest post-war industrial show. Remember — it's this week at the Metal Show!

ventional relay practice and it is this new design which makes the ultra high speed possible, at the same time assuring great reliability if operated in the usual speed ranges.

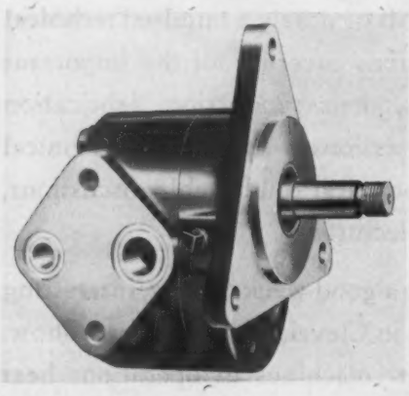
In the illustration a cut through section shows the glass envelope which surrounds all moving parts and protects them from moisture, dust or corrosive fumes. With

this new type of construction, sensitivities down to ½-milliwatt are possible. Ratings up to 5 amp can be obtained. Closing time can be less than 1 millisecond. Outside dimensions of the 115 v ac 1 amp rating are 3 in. high and 1½ in. base diameter.

Steel 2/4/46; *Item No.* 9999

Hydraulic Pump

High volumetric efficiency is said to feature the general-purpose hydraulic pump announced by Pesco Products Co., Cleveland (division of Borg-Warner). Calibrations are reported to show volu-

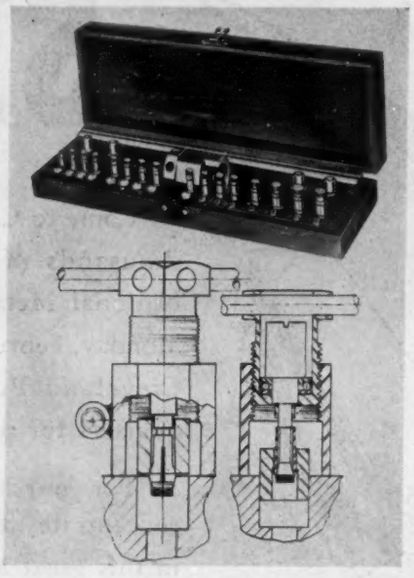


metric efficiencies of 95 per cent at 3000 rpm under pressure of 1500 psi. The gear-type pump, incorporating the "Pressure-Loading" principle of the Pesco aircraft pumps, is suitable for universal application where hydraulic power is utilized. It has triangular mounting pad, or SAE magneto flange, or is readily adaptable to other design mounting for special installations. Capacity rating is 3.5 gpm at 1500 rpm, 7 gpm at 3000 rpm.

Steel 2/4/46; *Item No.* 9913

Die Button Extractor Set

A pierce die insert extractor that reduces normally difficult operation of removing inserts to a matter of a few minutes, is announced by the Bolduc Specialties Co., 10074 Beechdale avenue, Detroit 4. The device can be used for straight or tapered hole type pierce die insert in the toolroom or while die is in the press. It also removes slip fit inserts



held with set screws or patented locks, a hand knob or jack is used depending on tightness of fit. Set Model B32 (illustrated) consists of 16 extractors which will remove any insert with hole size ranging from 0.258 to 0.510-in. inclusive. Pulling power is limited only by the tensile strength of the threaded portion of the smallest extractor which pulls well over 2500 lb.

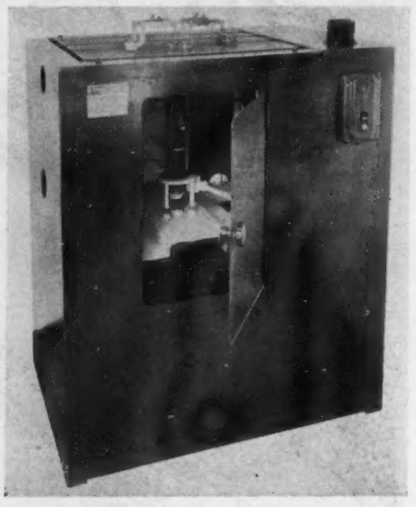
Steel 2/4/46; *Item No.* 9861

Testing Machine

Southwark Division of Baldwin Locomotive Works, Pittsburgh, offers a small machine for testing plastics, plywood and lighter sheet metals. This machine, with an alternating force capacity of 100 lb, also is ideal for testing structural components and machine parts in both repeated bending and repeated torsion.

An outstanding feature of the unit permits any predetermined alternating load to be kept automatically constant regardless of changes of deflection that may occur in the specimen under test. The 100 lb capacity of the machine can be adjusted in increments of 0.2 of a pound. Its speed is 1800 load cycles per minute and it has a maximum capacity in bending of 200 in.-lb and in torsion of 1125 in.-lb.

This universal fatigue testing machine will test plastics up to a thickness of ½-in., aluminum alloys of 3/16 of an inch,

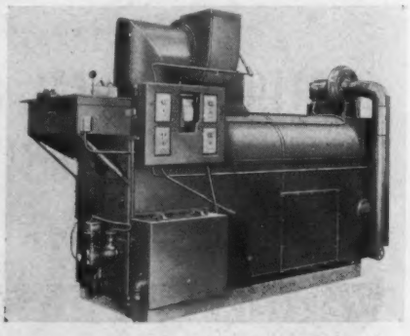


and steel of approximately ⅛ of an inch. There is ample space for testing bulky assemblies and it is adjusted easily for various specimen sizes. Numerous tapped holes and T-slots in the platens will accommodate special fixtures. The machine is seismically suspended in the frame to eliminate vibration to the floor.

Steel 2/4/46; *Item No.* 9809

Rinser and Dryer

A machine designed for the rinsing and drying of screw machine or small stamped parts, is announced by Optimus Equipment Co., 177 Church street, Matawan, N. J. This screw-drum type



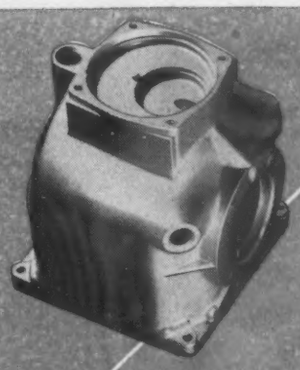
machine can be used for washing and drying, or rinsing and drying, or any part of these operations. It is also adaptable to a wash-drain, rinse-drain, cold or hot air dry operation sequence.

This equipment can also be adapted for pickling operations. Air steam passes

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 156.)

add qualities

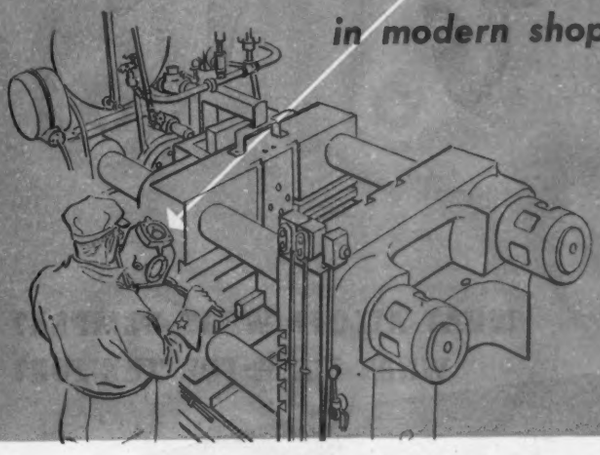
—add markets



-add lightness!

it's standard policy

in modern shops



When products need new features to step up their sales appeal, more and more enterprising manufacturers are putting their faith in lightness, for cutting useless dead weight serves to improve products of nearly every type. Magnesium die castings, the lightest of their kind, are doing an outstanding job of it in many fields.

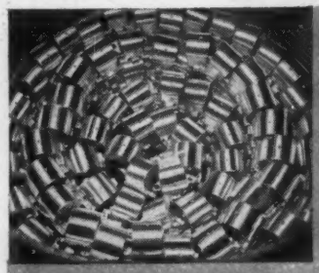
Die castings of magnesium are high in quality, light in weight, low in cost. They give you good surface finish, close dimensional tolerances, a minimum of machining. And above all, they are strong and sound. Small wonder that magnesium enjoys an established position as a standard die casting metal.

Technical assistance in magnesium application is readily available to you. At the nearest Dow office competent magnesium specialists await your call.

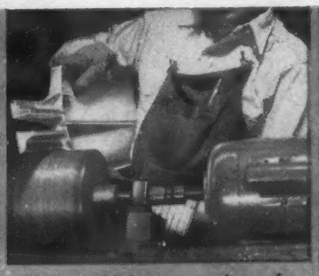
Ready . . . to make products move!

MAGNESIUM

LIGHTEST OF ALL STRUCTURAL METALS



Magnesium lends itself well to the speedy pace of die casting, producing large quantities of parts with resultant economy.

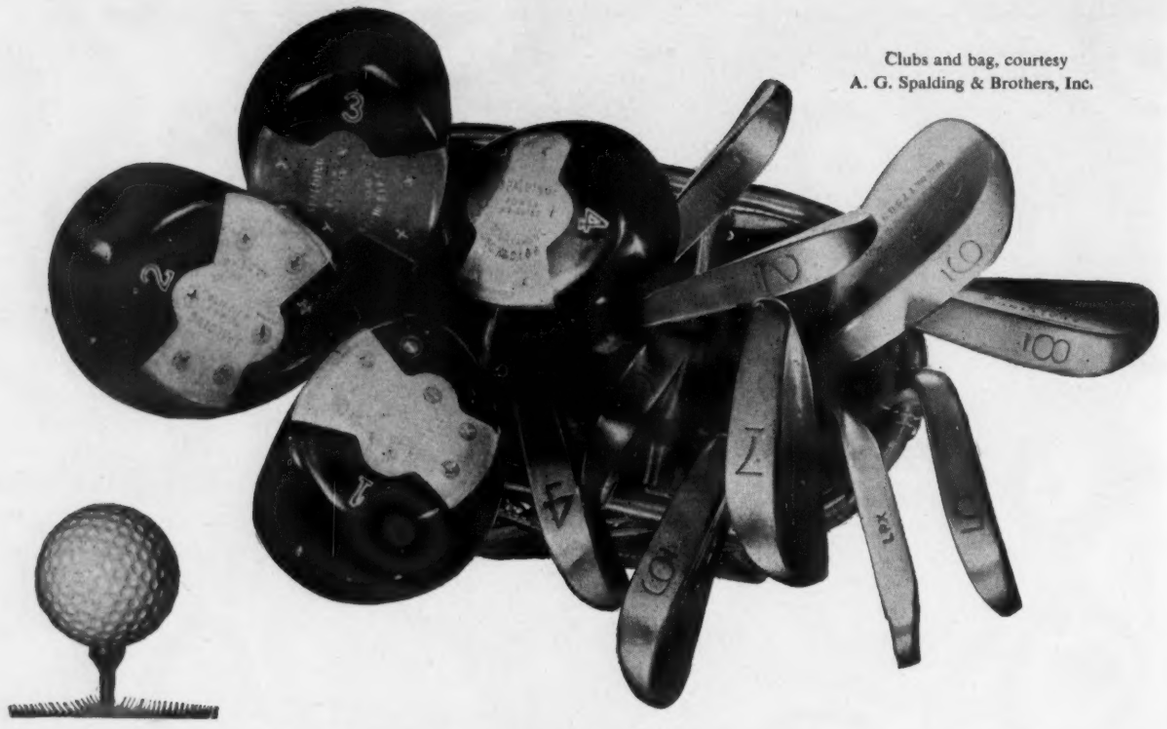


Well-established procedures for producing and finishing magnesium die castings are followed by experienced plants throughout the country.

Dow's close attention to die casting quality is backed by continuous research and development work in the magnesium field.

MAGNESIUM DIVISION • THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle



Clubs and bag, courtesy
A. G. Spalding & Brothers, Inc.

WHICH CLUB OFF THE TEE?

DRIVER, BRASSIE, SPOON . . . or perhaps even a "5" iron, you choose your club according to the shot you wish to make.

Today it's much the same with aluminum: You choose the alloy, temper and form best suited to each specific job.

For example, to manufacturers of certain products, high unit-strength is a vital factor. To others, lightness may be even more important. Still others may require superior adaptability to forming or corrosion-resistance; or a combination of qualities.

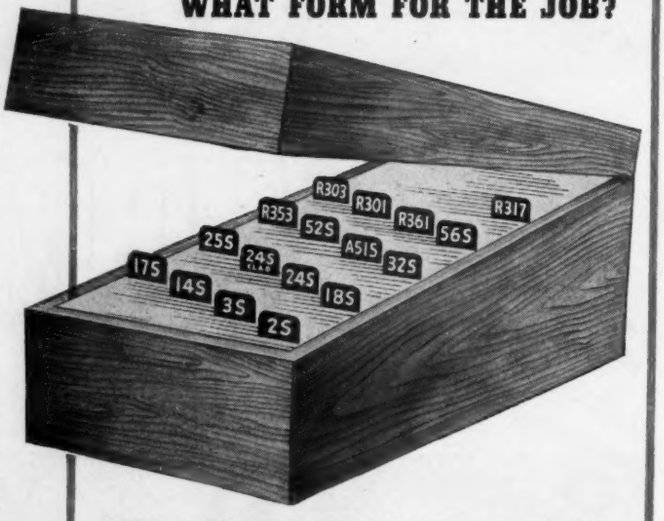
Use of the *right* aluminum alloy means a better, more serviceable product at lower cost. Reynolds will help you specify it.

Consider Aluminum . . . Consult Reynolds

Whatever your interest, Reynolds technicians are ready to cooperate with your engineers. Offices in principal cities. Phone nearest office or write Reynolds Metals Company, Aluminum Division, 2520 So. Third St., Louisville 1, Ky.

Detroit Address: 1010 Fisher Building

WHAT ALLOY? WHAT TEMPER? WHAT FORM FOR THE JOB?



Match the alloy to the job, obtaining the temper needed in the form best adapted to your production. Result: a better product at lower cost.

REYNOLDS METALS

9271-A1-2B

REYNOLDS ALUMINUM

The Great New Source of

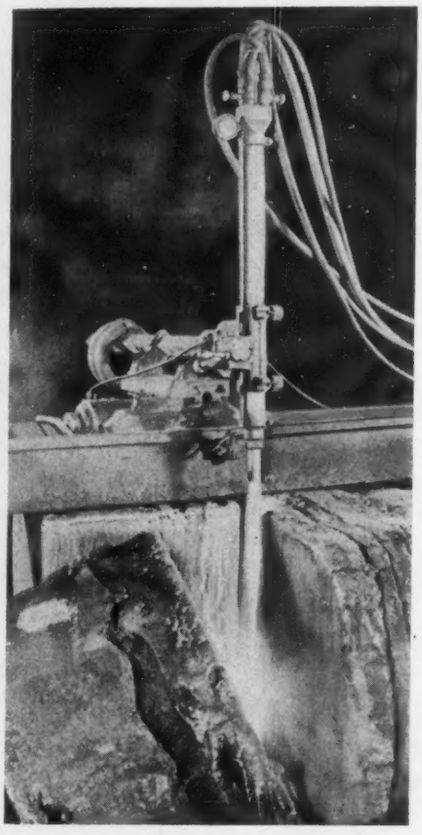
INGOT · SHEET · SHAPES · WIRE · ROD · BAR · TUBING · PARTS · FORGINGS · CASTINGS · FOIL · POWDER

through heater and blower providing for either or both cold and hot air blast system. Air loss is avoided by enclosed dryer end. Various parts of the machine are readily accessible for lubrication, maintenance, or alterations and cleaning such as might be required in hardwater areas. Centralized lubrication may be provided.

Steel 2/4/46; *Item No.* 9985

Machine-Cutting Blowpipe

A heavy-duty, oxyacetylene cutting blowpipe, the Oxweld C-45 machine-cutting blowpipe, has been developed by Linde Air Products Co., 30 East 42nd street, New York. It is particularly suited for hot top cutting, ingot slitting, riser cutting, cutting large forgings, and



scrap cutting in applications where oxygen lance formerly was required.

The C-45 is water cooled and is intended to be mounted on a heavy-duty, straightline cutting machine such as the Oxweld CM-37 or CM-21 cutting machines. A 50-lb gage is attached to blowpipe body for checking cutting-oxygen pressures. Medium-pressure acetylene is used, with a generator or a manifold having a minimum hourly capacity of 500 cu ft of acetylene.

Also available is the Oxweld C-45 blowpipe holder, designed especially for this blowpipe. It provides ease, accuracy, and stability in making vertical and angular adjustments. Vertical adjustment is obtained by turning a ball crank which operates a worm and gear that meshes with blowpipe rack. A total angular adjustment of 135° can be obtained in the plane of the cut.

Steel 2/4/46; *Item No.* 9963

Plate Bending Roll

Webb Corp., Webb City, Mo., has announced addition of another plate bending roll known as model 6-L. The roll is an initial pinch type and is equipped with 9-in. diameter rolls throughout. Machine features compactness, sturdiness and modern appearance. It is manufactured in the following sizes: 4 ft—5/8-in. stock; 6 ft—1/2-in. stock; 8 ft—3/8-in.; 10 ft—1/4-in.; and 12 ft—of 3/16-in. mild steel plate. Addition of this model makes the Webb line of plate bending rolls complete in both the pyramid and initial pinch types.

Steel 2/4/46; *Item No.* 9960

Contour Grinder

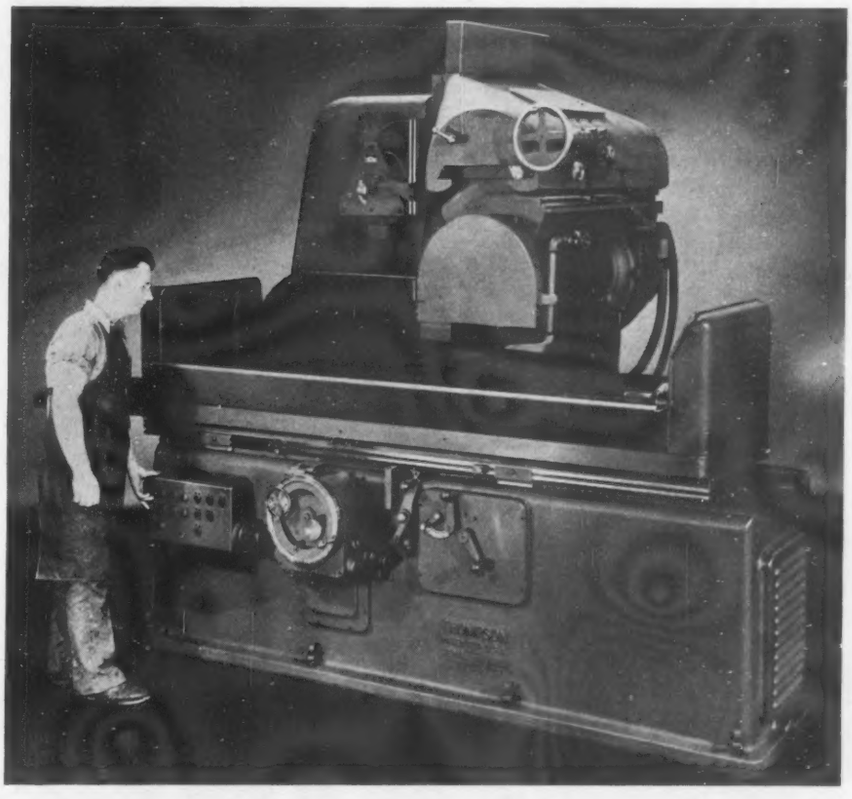
An automatic crush form contour grinder, is offered by Thompson Grinder Co., Springfield, Ohio. It may be semi-automatic or fully automatic depending on the application. However, the machine illustrated was designed for mass production and incorporates electrically actuated and controlled grinding and crushing cycle, completely interlocked. Aside from lowering head for contact between wheel and crusher roll for crushing and truing, operation is fully automatic and after original set-up operator presses a series of starter buttons to put machine through its various cycles of operation. Control includes automatic down-feed, spark-out, and up-feed, automatic table reversing and automatic table positioning for starting work and crushing or truing. Automatic cross-feed is included but is used only when machine is doing conventional surface grinding.

Steel 2/4/46; *Item No.* 9863

Vibration Test Machines

Series A vibration, rocker and slosh-test machines for production and laboratory use are available from Globe Industries Inc., 125 Sunrise place, Dayton 7, O., under the name of Vibrock machines. They simulate conditions set up by motors in operation, loaded gasoline tanks in automobiles, trucks and aircraft, and whatever vibration may occur in machine tools at work.

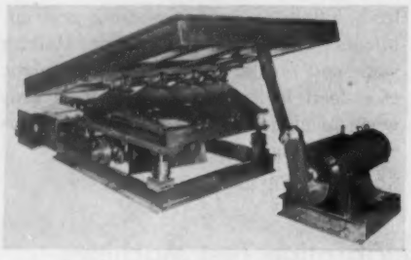
There are four types of Vibrock testers to aid in making vibration fatigue, shake-down or break-up tests which lead to necessary corrections in design before the product tested goes into production. They will handle specimens weighing



(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 156.)

up to 5 tons and requiring mounting area as large as 77 x 108 in. Model A-VR is a vibrator and rocker combined, model A-R a rocker only, model A-V-x is a vibrator only, while model A-VRR is a vibrator, rocker and rotatable.

Height of test surface from floor of model A-V is 30 in., of model A-R 50 in., and of model A-VR 50 in. Frame dimen-



sions at base of A-V are 141 x 81 in., of A-R are 94 x 81 in., and of A-VR are 171 3/4 x 81 in. Weight of the three units individually is 3310, 2675 and 5265 lb, respectively. Explosion-proof motor equipment includes 3 hp vibrator drive with speed reducer, and 5 hp rocker drive with gear speed reducer. Direction of vibration is vertical, with frequency of 8 to 45 cycles per sec; amplitude of vibration is 0.01-in. to 0.05-in., obtained by changing eccentric masses. Rocker frequency is 2 to 17.4 cycles per min, obtained by adjusting gear reducer speed. Tilt amplitude is 14° 37 ft above or below horizontal. Table top areas—of two types, wood or open frame—measure 77 x 104 in. for the wood top and 79 x 81 in. for the open frame.

Steel 2/4/46; *Item No.* 9961

Tap Reconditioner

Increased flexibility and an expanded range of capacities enabling reconditioning of taps from the small machine screw sizes up to 1½ in. in diameter has been built into the improved tap reconditioner, being marketed by Detroit Tap & Tool Co., 8432 Butler avenue, Detroit 11.

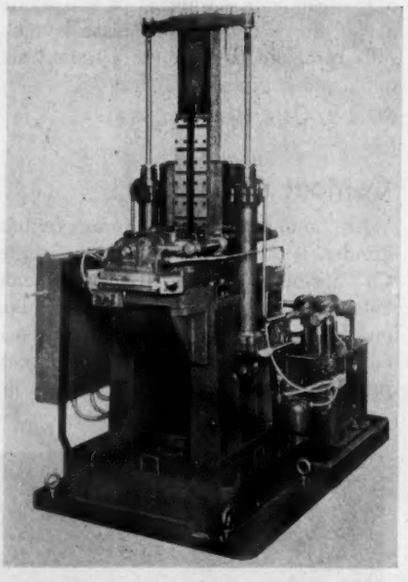
All operations for keeping taps in good condition can be performed on the device as it is actually a 4-in-1 machine, having facilities for full-range chamfering, spiral pointing, point polishing, and grinding the full length of tap flutes. Taps of from two to seven flutes can be chamfered on the improved machine, and flutes and spiral points can be ground on taps having from two to six flutes. All sizes and types of taps can be point polished.

Provision of a high precision spindle head permits a wide range of motor types for various service voltages, frequencies, and phases encountered in plants. High rigidity of spindle head and continuous adjustability for grinding tool wear is provided by mounting spindle assembly on large dove-tail ways in the pedestal base. A large compartment in the machine's base affords ample storage room for the "quick change" type collet chucks used interchangeably on both the chamfering and the flute grinding and spiral pointing units.

Steel 2/4/46; *Item No.* 9864

Broaching Machine

Special purpose machine for broaching the inside diameter and split-line surface of automatic type precision half-bearings, is introduced by Hydraulic Machinery Inc., 12825 Ford road, Dearborn, Mich. Cycle of these vertical type ma-



chines is entirely automatic except for loading and unloading. Cycle of operation: (1) Manual—load bearing; (2) automatic—operator presses two palm buttons, (a) nest block moves in and clamps bearing, (b) nest block is locked in position, (c) broaching slide moves down, (d) nest block is unlocked and returns to loading position (e) broaching slide moves up—end of automatic cycle; (3) bearing is manually unloaded. These machines are powered by a Hy-Mac hydraulic power unit. Cycle of the machine is accomplished by hydraulic sequence valves, solenoid operated four-way valves, pressure switches, limit switches and a special electrical control panel. Movement and locking of nest block is accomplished by special cylinders built into the nest block slide. Movement of broach slide is accomplished by two swivel type cylinders with adjustable cushions at both ends.

Built into base of machine is a coolant pump and sump. Directly under the broaching station are two metal baskets, the first for catching chips and the second for screening the coolant. Broaching stroke is adjusted at the rear of the broaching slide. Nest block clamping is adjusted at the front of nest block slide. Nest is adjusted at sides of nest block.

Steel 2/4/46; *Item No.* 9848

Plug Gages

A complete range of tungsten carbide thread plug gages, both standard and special, is announced by the Sheffield Corp., Dayton, Ohio. Tungsten carbide thread plug gages are normally used on high production and close tolerance jobs. Due to the extreme hardness of tungsten carbide, gages made from this material make it possible to produce parts to closer limits as no wear allowance is necessary.

Steel 2/4/46; *Item No.* 9983

Spray Gun

An improved light-weight spray gun is announced by Binks Mfg. Co., 3114-40 Carrol avenue, Chicago 12. The gun, known as model 19, has many advantages. Its weight is only 1 lb, 7 oz; it is

extremely easy to operate; and grip is designed to fit comfortably into hand. Combination results in reducing fatigue to minimum.

Large air passage through gun results in better utilization of the air. All controls are conveniently located at back. Spray pattern is quickly adjustable from round to flat, with all widths in between. Each of gun's few parts is of the best material for its particular function. Body is aluminum; air nozzle is bronze; fluid nozzle is made of a special hardened steel. Entire gun is heavily nickel-plated. Hardened plate where trigger contacts air valve stem prevents wear, Nozzle is of self-centering type, de-

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 156.)

another RACO first:

Announcing a new series of High-Tensile Steel Electrodes for horizontal fillets, flat fillets and deep grooves in low alloy, high-tensile steels.

These electrodes are used on direct current and alternating current with equally satisfactory results.

Experience has proved RACO 8020 superior for such work as high-pressure power plant piping, dredge booms and cable drums. Likewise RACO 9020 and RACO 10020 for outstanding results on such jobs as heavy-duty machinery construction and oil well casing.

These electrodes comply with A.W.S.—A.S.T.M. Specification A233-45T, Grades E8020, E9020 and E10020.

RACO 8020
for lower carbon grades of low-alloy structural steels: JALTEN, R. D. S., YOLOY, N-A-X, etc.

RACO 9020
for medium carbon steels with or without low-alloy content.

RACO 10020
for high-tensile steels such as 2½% and 3½% nickel steels and 0.50% carbon steel.

The REID-AVERY COMPANY
INCORPORATED
DUNDALK BALTIMORE 22 MARYLAND

SINCE 1919 PRODUCERS OF ARC WELDING ELECTRODES AND WELDING RODS

signed on tapered seat principle. Air cannot leak back through the retainer ring. Air valve is a cartridge type. Hose connections are standard. Needle valve is easily adjustable.

Special adaptation of model 19 is model 19V, for ceramic finishing. It is identical to model 19 except for material nozzle and needle valve which have tungsten carbide inserts.

Steel 2/4/46; *Item No.* 9959

Electrodes

Metal & Thermit Corp., New York, announces three new Murex welding electrodes, as follows:

TYPE U—A mild steel electrode for general purpose welding which meets AWS requirements for Grade E 6013. It is primarily a single-pass fillet electrode which may be used in any position with alternating current or with direct current on either polarity. Type U said to possess excellent welding qualities, easily removed slag, and it deposits clean, sound weld metal.

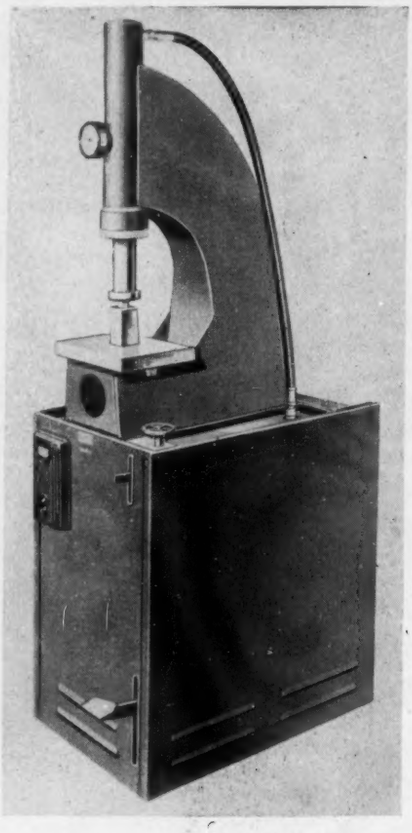
TYPE MA — An AWS Grade E 7011 electrode is designed for all-position welding of carbon molybdenum and other high strength steels where alternating current is employed. Type MA also may be used with direct current, either straight or reverse polarity. It has excellent arc characteristics and a readily controlled slag. The weld deposit is smooth, uniform and slightly convex in shape.

TYPE 347 — An electrode for welding 18-8, 19-9, and similar stainless steels where stabilization with columbium is required. Type 347 has a titania type coating and may be used with either alternating or direct current. Arc action is steady and soft, and x-ray properties are excellent. Type 347 is primarily designed for butt welding in the flat position.

Steel 2/4/46; *Item No.* 9916

Hydraulic Presses

Positive, self-contained hydraulic presses with self-contained motor drive for production work are available from Munton Mfg. Co., Franklin Park, Ill. They are foot operated, mounted either



with bottom of press open or flush as illustrated. Capacities of 4½, 7, 10, 15, 20, and 25 tons are available, with means to limit pressures as low as required. Pressure gages determine pressures being applied. A holding valve (an extra), which causes ram to be held under pressure until level is tripped, enables press to be used for molding or glue weld operations.

Construction is heavily reinforced where needed. Rams are interchangeable, permitting greater speeds with lower pressure rams or higher pressures at lower speeds, thus affording a wide range of production.

Steel 2/4/46; *Item No.* 9926

Oil Gages

Oil-Rite Corp., 3409 South 13th street, Milwaukee 7, announces a line of recently developed oil gages available in a complete range of sizes and styles.

The gage body is of brass, the sight is of unbreakable plastic which is supported by a heavy central stem and a top cap. The assembly is locked with an independent nut compressing the cork gasket, thus eliminating any leakage. Use of plastic sight eliminates hazards and cost of replacing glass. It also eliminates the unnecessary protective shell usually used on glass gages and, therefore, offers unlimited visibility. The gages can be taken apart for cleaning and can be installed where there is insufficient room to screw in a one piece gage.

Standard sizes cover a gage range of 1¼ to 5 in. and sight diameter of ½-in. to 1 in. with stock threads of ⅛, ¼, ⅜, and ½-in. N. P. T. Special height and length gages can be furnished, as well as gages with drain plugs or straight gages for applications where the elbow type is not suitable.

Steel 2/4/46; *Item No.* 9918

FOR MORE INFORMATION on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

Circle numbers below corresponding to those of items in which you are interested:

9968	9985	9848
9868	9963	9983
9051	9960	9959
9999	9863	9916
9913	9961	9926
9861	9864	9918
9809		

2-4-46

NAME ..... TITLE .....

COMPANY .....

PRODUCTS MADE .....

STREET .....

CITY and ZONE ..... STATE .....

Mail to: STEEL, Engineering Dept.—1213 West Third St., Cleveland 13, Ohio

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on this page)

A Candle Won't Broil a Steak

—and neither will inadequate wiring run electrical equipment at FULL CAPACITY

Wire ahead!

IF A MACHINE is running 1500 RPM, and it should run 1800 RPM, don't blame the operator. Chances are that *reduced voltage* is curtailing the machine's production. In fact, inadequate wiring can reduce efficiency as much as 25% to 50%!

Check up now on your *real* power needs! Don't let obsolete wiring handicap expensive production equipment. Remember that emergency alterations later may cost much more than foresighted wiring improvements today.

Talk it over with consulting or plant power engineer, electrical contractor or power salesman. They'll advise: Wire Ahead! Anaconda Wire & Cable Company, Subsidiary of Anaconda Copper Mining Company, 25 Broadway, New York 4, N. Y. Sales Offices in Principal Cities. 46290

Look to Anaconda for wire and cable controlled from copper ore to finished product by Anaconda basic research and engineering. Every Anaconda product is a lasting investment . . .

Check your wiring plans before they check you!

DON'T BE PENNY-WISE AND POWER-FOOLISH

ANACONDA **ANACONDA WIRE & CABLE COMPANY**

Million-Amp Butt Weld

(*Continued from Page 123*)

On the way, lugs are welded to each end for positioning the tube in the welder. The tube is slid into the electric flash welding machine over a water-cooled arbor and centrally positioned by means of the special lugs. Then the arbor expands, clamping the tube against electrical contacts near the edges.

As the hydraulic mechanism moves the edges together, the operator throws a switch and a million-ampere arc surges across the line of contact, heating the edges for the entire 40-ft length simultaneously until the steel becomes semi-liquid. Just before the current is cut off the two edges are bumped together automatically. This makes the weld. At the same time, a predetermined amount of steel, together with the oxides formed by the heating, is squeezed out, resulting in a clean, sound, and strong union. Fig. 5 shows one of these million-dollar, million-ampere flash welding machines.

Since this welding operation is largely automatic, uniformity of the weld is assured. With the squeezed-out weld flash protruding from both sides of the red hot weld, the pipe is pushed on to another conveyor by the next tube entering the welding machine from the opposite end.

Loose flash is dumped out of the pipe and, if necessary, it is subjected to preliminary straightening on its way to the battery of flash trimming machines. The pipe is pushed over a pull rod in the flash trimmer and is securely clamped in dies for its entire length. This pull rod is attached to a cutting tool carrier on the inside of the pipe, working in conjunction with a similar carrier on the outside. As these tools move along together, the weld flash is removed from both the inside and outside simultaneously to within 1/16-in. or less of the pipe surface. Then the dies open, the pipe is pulled out, and all the chips and cutting compound are expelled with compressed air. See Fig. 7.

At the following stations, Fig. 8, both ends are expanded to the required circumference and they are also faced, all preliminary to the subsequent operation—the internal sizing of the pipe.

Enters Sizing Machine

For this important step, the pipe enters a massive machine, Fig. 9, where it is confined within a horizontally divided die, bored to exacting dimensions. Having been purposely made undersize in diameter, the pipe easily fits into the die as the lower half is raised against the upper half and locked. Sealing heads move against each end within the die and the pipe is filled with water.

It is then subjected to an internal hydrostatic pressure sufficient to stress the steel in the pipe beyond its yield point. In other words, it stretches circumferentially—as much as 1⅜ in. for a 26-in. diameter pipe—until it fills the die. Besides being a conclusive test of the soundness and strength of the weld, this operation makes the pipe round, straight and of the correct diameter.

But equally important, this expansion cold works the steel, raising its circumferential yield strength and thus considerably increasing its capacity to withstand internal pressures. This cold working has contributed more to the safe use of higher working stresses than any single recent development in pipe manufacturing. The increase in yield strength—for example, from an original 42,000 psi to a minimum of 52,000 psi—can be translated into a *greater safety factor* in the pipe or a corresponding *saving of steel* for the line.

After internal sizing, the pipe is faced on both ends to the bevel or contour specified by the customer and then moves into the final testing machine. This test is conducted primarily to comply with A. P. I. specifications, at the same time providing an inspection for leaks and

Simple device developed for

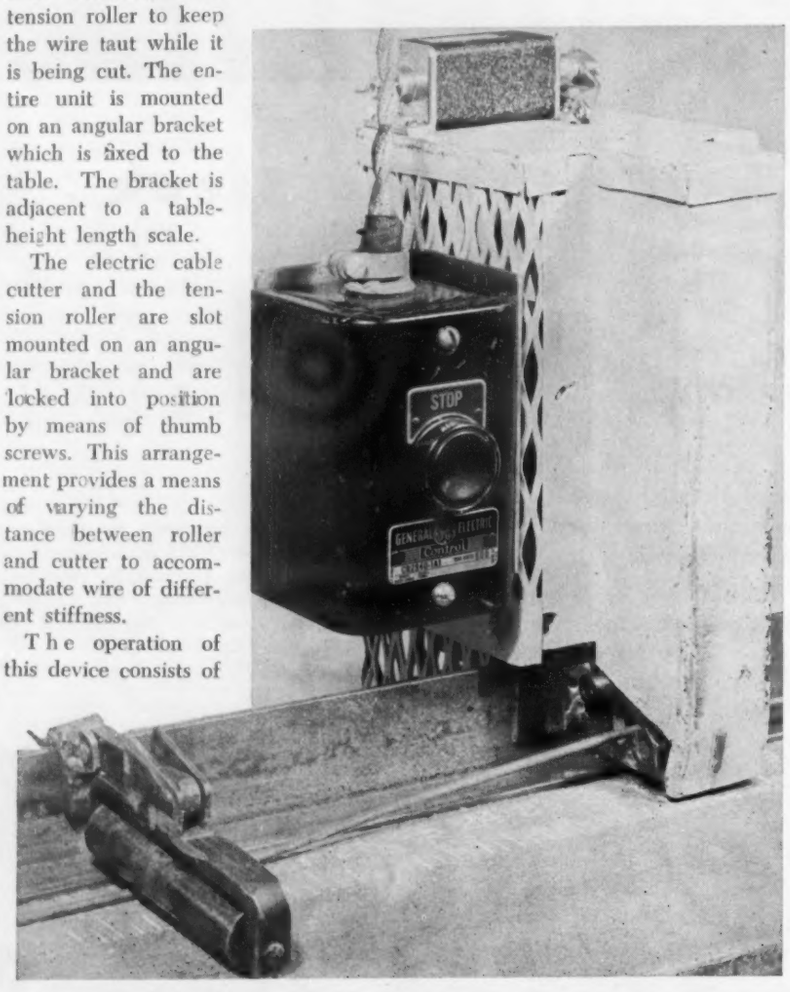
Cutting Wire Lengths

AN easy to make, time saving device has been designed at General Electric's Pittsfield Works where it was used to cut wire for control panel cable assemblies. The unit consists of a metal housing which contains a cutter activated, through a system of levers, by a push-button-operated, 110 v solenoid, and a tension roller to keep the wire taut while it is being cut. The entire unit is mounted on an angular bracket which is fixed to the table. The bracket is adjacent to a table-height length scale.

The electric cable cutter and the tension roller are slot mounted on an angular bracket and are locked into position by means of thumb screws. This arrangement provides a means of varying the distance between roller and cutter to accommodate wire of different stiffness.

The operation of this device consists of threading the cable through the cutting hole and under the roller, drawing it to the desired length on scale, and pressing control button.

If desired, the operating switch may be positioned anywhere on the scale by installing the switch at the end of a flexible lead.

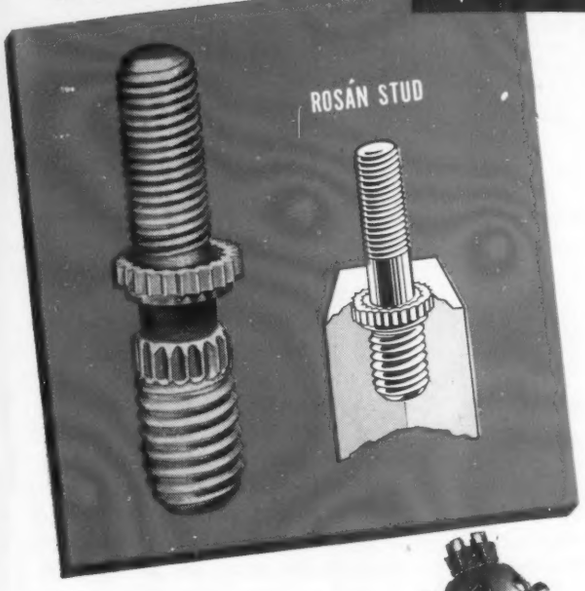


NOW "National" offers High Tensile Fastenings for

INSTALLATION OF INSERT WITH LOCKING RING
1. Drill, counterbore and tap
2. Screw insert flush with surface
3. Drive in locking ring

Soft Metals and Plastics

Rosán INSERTS AND STUDS STAY TIGHT



The tendency of fastenings to work loose under vibration or torque is overcome by the Rosán Locking System for inserts and studs, now made by National Screw & Mfg. Co.

Rosán Fasteners may be molded in, or easily installed in parts after forming. The entire design is based on a simple serrated ring which locks either an insert or stud in position, and so prevents loosening or turning by any stresses on the connecting unit.

Securely locked in place, a Rosán Fastener gives a long wearing, high strength tapped hole or a firmly anchored projecting stud. It can be removed by drilling without disturbing the parent material.

Send for samples and full information on these revolutionary new fasteners, already adopted by leading aircraft companies and other industries.

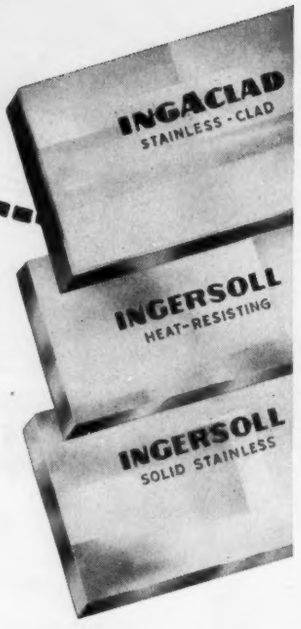
(Patents issued and pending, U. S. A. and foreign countries)

National HEADED AND THREADED PRODUCTS

THE NATIONAL SCREW & MFG. CO., CLEVELAND 4, O.

ON YOUR NEXT "Stainless Job"

FIGURE THE LOWER MATERIAL COST OF INGACLAD STAINLESS-CLAD STEEL
See how you save---



In designing new products . . . new plant equipment . . . or in modernizing your present plant, it will pay you to consider the generous use of Stainless Steel. Now more than ever you can use it freely because IngAclad Stainless-Clad Steel, at much lower cost, gives all the stainless service you will ever need . . . on the side that is used.

Ingersoll Steel Division of Borg-Warner Corporation produces both IngAclad and Ingersoll Solid Stainless Steel. Our engineers are, therefore, in a position to advise you without prejudice. This helpful service is yours without obligation.

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Groen Mfg. Co.
Leader Iron Works
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Procter & Gamble Co.
Sherwin-Williams Co.
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and many others

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STAINLESS-CLAD STEEL
"A Borg-Warner Product"

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( ) IngAclad Two-Ply Stainless-Clad Steel
( ) Ingersoll Heat-Resisting Steel
( ) Ingersoll Solid Stainless Steel

All of the above Steels in Chrome-Nickel Types

( ) Free Manual of Welding and Fabricating Procedures for IngAclad

checking the resistance of the weld to shock while under pressure. With ends sealed, the pipe is subjected to hydrostatic pressure, producing a hoop stress of at least 80 per cent of the specified minimum yield point, but not to exceed 1950 psi. While under this pressure, repeated blows are struck on the weld area by 6½ lb hammers, placed at 2 ft intervals.

Following the hammer test, the pressure is reduced 50 per cent and the inspector examines the entire length of the weld area to make certain of the absence of leakage, whereupon he stamps his okay on the pipe. It then rolls onto a live conveyor and proceeds to the final inspection.

Pipe Carefully Inspected

Inside and out, every length of pipe is carefully inspected. Each dimension is checked with special gages. The ends are checked for size, contour, and roundness; the wall thickness is checked with snap gages; diameter and circumference are checked to insure uniformity of the pipe. Visual examination of the exterior and interior surfaces is conducted with great care to catch any flaw which may have escaped previous inspection or developed during processing. Upon passing this critical inspection, the pipe is measured for length and weighed, and the data noted inside the pipe.

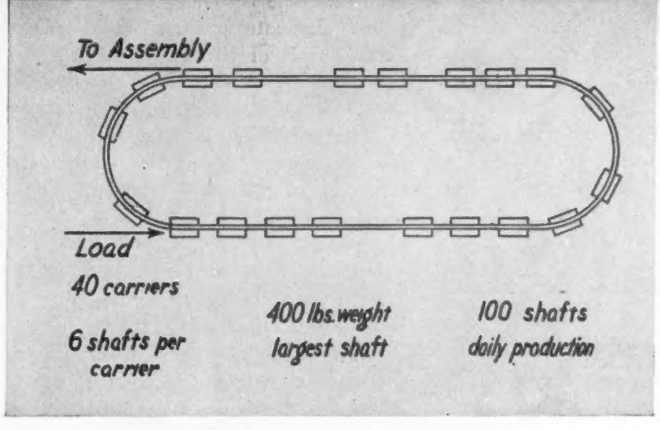
The conveyor now takes the pipe through a washing machine using a hot alkali solution which removes any grease or dirt that may have been accumulated during its passage through the mill. The size, length and weight are stencilled on the inside of the pipe, and then the customer's inspector is given an opportunity to further check the pipe if he so desires.

At this point, painting machines such as the unit in Fig. 6, are available to apply a priming coat, should that be specified. The finished pipe is conveyed onto a loading platform from which it is picked up by a crane and deposited in a gondola car. The load is built up, stacked and tied according to carefully worked out plans for each size of pipe. This efficient system was developed from long experience and has proved most successful.

—o—

A color code for marking physical hazards has been completed by American Standards Association, 70 East 45th Street, New York. Its purpose is to unify the colored markings used on physical dangers to be avoided and to identify other protective equipment. It deals with applications such as marking of safety cans, fire sirens, posts, hand rails, unguarded edges of platforms, locations of gas masks, stretchers, etc.

AN INEXPENSIVE STRAIGHT-LINE PRODUCTION SYSTEM.....



This overhead Tramrail System brings the work to the workers and eliminates waste motion. The shafts flow in a definite predetermined path. Greater efficiency is secured.

A manufacturer of Diesel engine crankshafts is obtaining the many advantages of straight line production with a Cleveland Tramrail overhead rack-carrier system.

The shafts are conveyed on hand-pushed turntable type carriers to the various machine tools. Machining operations are performed in logical sequence. After traveling the tramrail circuit, the shafts are ready for the assembly line.

Tramrail equipment is especially advantageous for this work because the working height at which the carriers travel can be made to suit the machine-tools. As a result shafts can be delivered to or removed from the machines with little or no lifting.

This system has completely reorganized the department and the hard time-consuming tugging and lugging of heavy skid-loads of shafts from machine to machine is eliminated. Production has been stepped up and costs cut.

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Mathews

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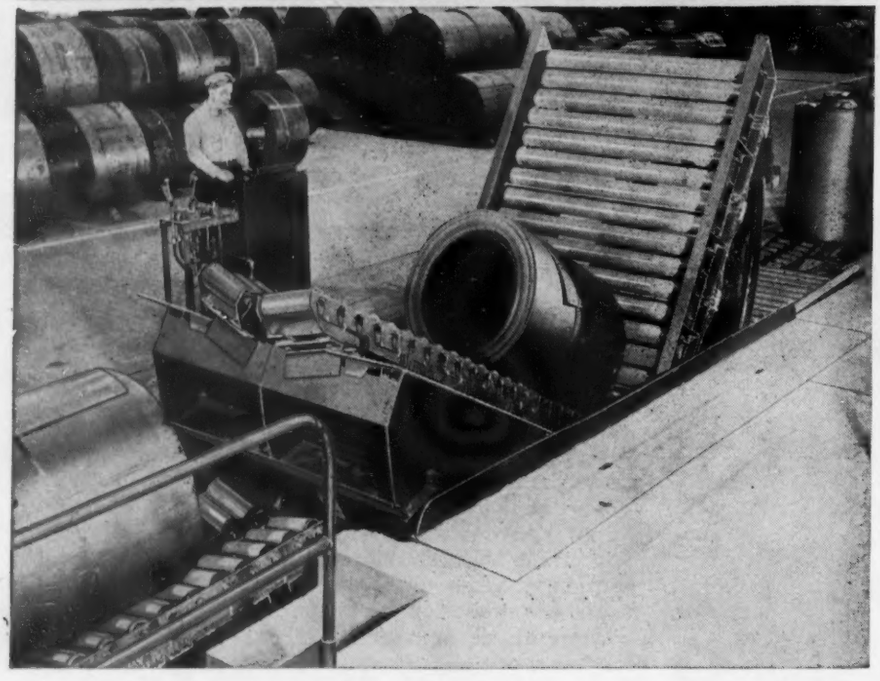

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Welded Machinery Parts

(*Continued from Page* 127)

quired warrant the expense of dies.

A simple example of blanking or punching is the shearing of a rectangular plate. By blanking the piece only one operation is required in comparison to four operations for each piece which would be necessary in shearing. Hence, a comparison of blanking and shearing costs can be made merely by multiplying cost of the added three shearing operations by the number of pieces required and comparing this with cost of tooling. Naturally, the estimate will be approximate since relative cost per hour of machines used might affect the comparison. Another important benefit gained by blanking is the comparatively close tolerance that can be achieved.

Formed Components

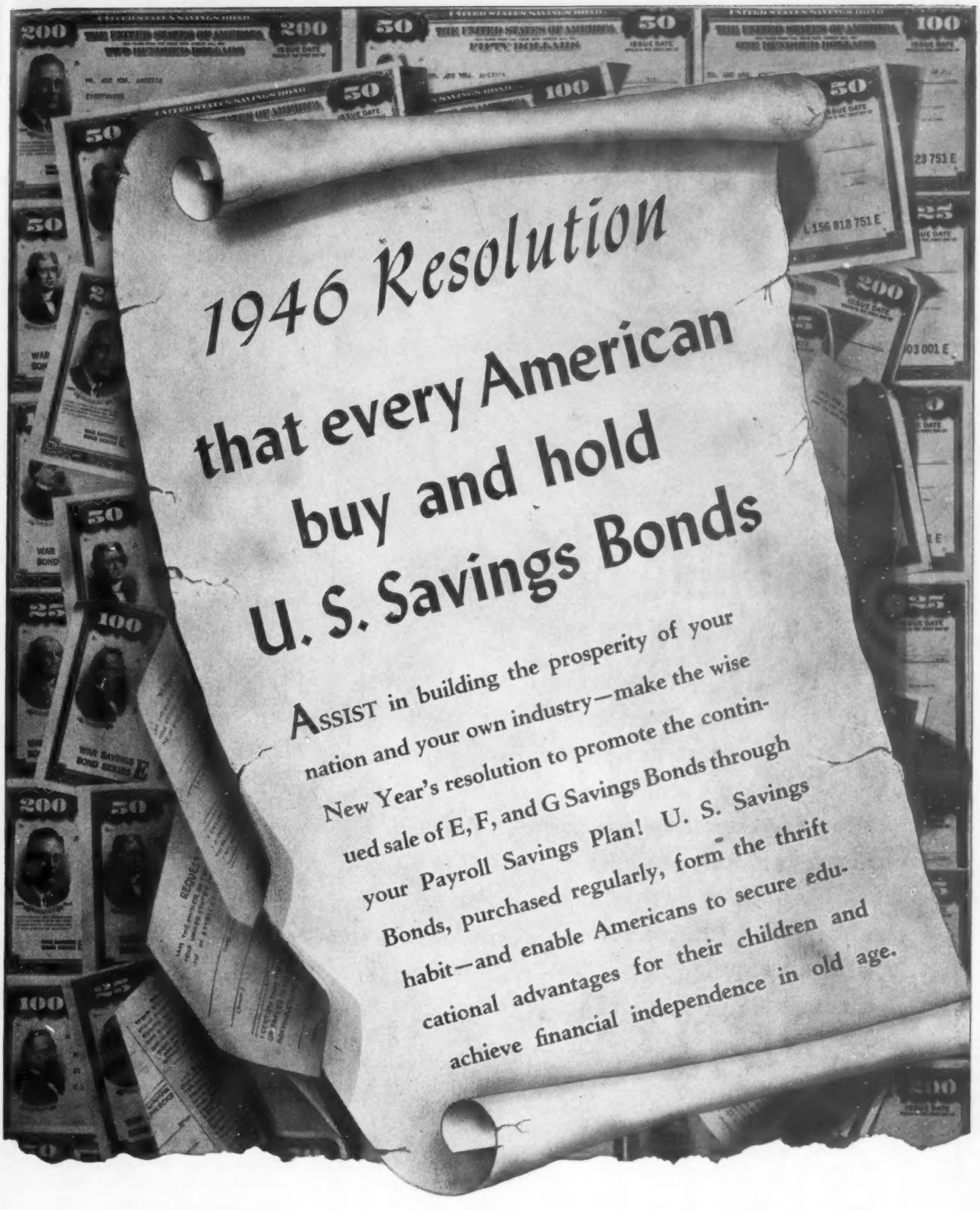
Thus far, only flat pieces have been considered in preparation of components; thought must be given also to formed type components which are required frequently in weldments. Several methods are in general use for forming components for weldments. One of these is press bending which is used to make horizontal angular bends.

Definite reasons for forming operations such as bending or flueing have been evolved. One is lower cost, for angular bends eliminate one or more welded joints. Cost of bending seldom equals that of the alternative assembly and welding. Careful examination of design proportions of metal sections might show the economy of using the same metal thickness of web and flange to utilize the advantage of a bent section. A bent component naturally is more rigid than a flat one. This can be important in the control of shrinkage and warpage.

Another method, often of value in components, is the specialized forming operation know as flueing, shown in Fig. 9. These flued openings when machined, provide formed seats for covers. Generally, such a cover is designed to be fastened by an inner clamp as shown at left in Fig. 8. Treatment permitted by flued opening eliminates assembly, welding and consequent warpage, and cost of many drilled and tapped holes as shown at the right in Fig. 8. In addition, weight reduction is achieved.

Another function of flued openings in weldments is to provide stiffening lips, which are executed normally by welding a band around the opening where required by design considerations.

Since dies are necessary, flued openings are unwarranted economically, unless quantity of openings justifies their use. When flued openings are being considered, designer should consult the sup-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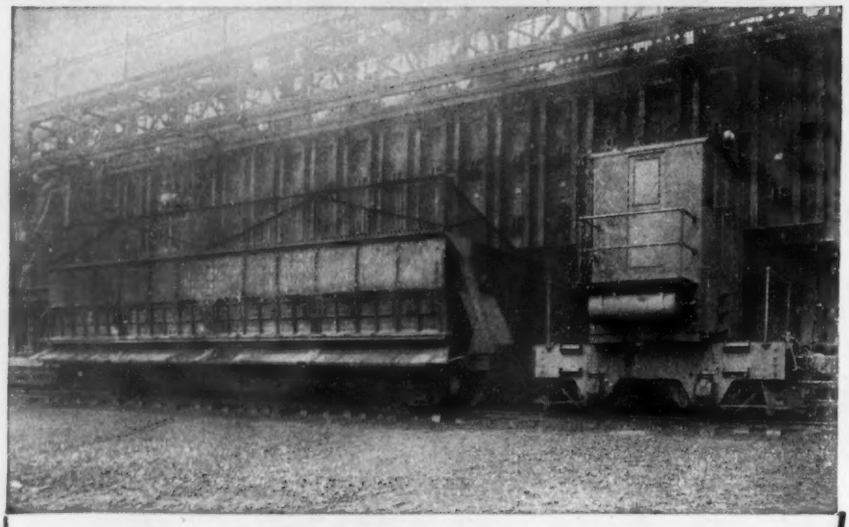

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plier for it is possible that dies exist which can be adapted.

Products of flanging, or spinning machines often are utilized to advantage in weldments, as in melting pots. Bottom corner of the pot is composed of a flanged head split in half, with one-half serving for each corner.

Use of flanged products in components may provide component rigidity, possibly simpler welding conditions, or a reduction in welding. Flanging also provides curved contours which may be desired for proper functioning or for the sake of appearance.

Stamping and Pressing

When quantities justify, formed components produced in special shapes by forming dies on power presses may be used advantageously. Fig. 6 (top) is one of four small stampings which form the corners of a weldment. Forming, required on remaining components, is by press brake. Fig. 6 (below) shows relation of various components in this weldment. A useful method of shaping cylindrical contours is provided by bending rolls. A component formed in such a manner is shown in Fig. 10.

Shapes

At times, shapes formed on a rolling mill may be used justifiably in weldments. Their value as components results from two factors:

A reduction in cost because of elimination of welding, and initial rigidity which can tend to simplify fabrication problems of shrinkage and warpage. In considering use of structural rolled shapes, tolerances possible in such rolling mill products should be studied carefully inasmuch as they may easily affect adversely the design requirements.

Steel castings are used extensively as components in weldment. They are used where economy in producing complicated shape requirements or special contours at given points in a particular assembly are involved.

When castings are to be used in weldments, their physical and chemical properties should be specified carefully. Also, where size permits, it is desirable to have castings of electric furnace steel which seems to possess greater cleanliness. This is important in obtaining good welds with minimum difficulty.

Drop forgings also may be used when their size and quantity justify the investment in dies. This product has good homogeneous properties and, when properly controlled, its tolerances are close. A number of drop forgings may be joined by flashwelding as illustrated in Fig. 11.

(*Continued next week*)

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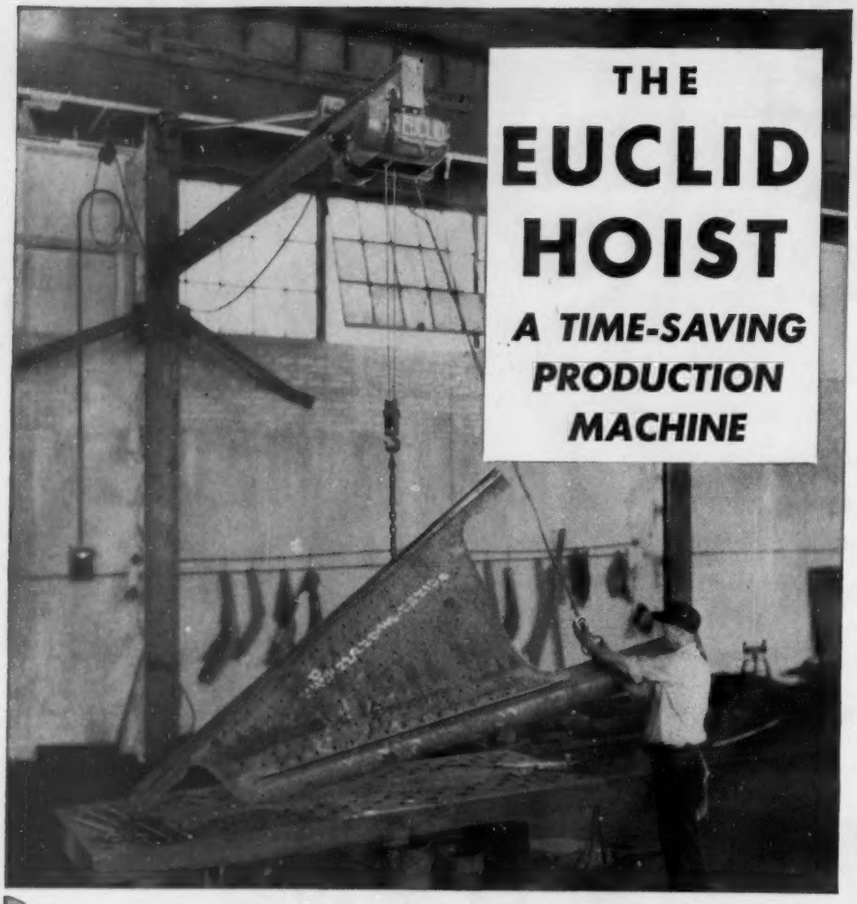

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Precision Casting Practice

(*Continued from Page* 129)

burnout be limited to a top heat of 1350°F and that the furnace be ventilated so that the wax fumes are carried off and a concentrated reducing atmosphere avoided. A view of the company's burnout and casting research department is shown in Fig. 10.

Temperature of Flask: Efficiency of the burnout will determine the range of flask temperatures available. Burnouts at high temperatures make it necessary to cool the flask before casting, with the result that accuracy is lost, as the cooling curve of an investment does not follow its thermal expansion curve. In some cases this physical change will cause cracking of the investment. To obtain a greater range of flask temperatures, elimination of the wax at low temperatures is most desirable.

Selection of the proper casting temperature for the flask depends on two factors: The type of metal to be used, and bulk of the metal involved in casting. Flask temperature is relative to the melting temperature of the metal to be cast. A certain brass, for example, may melt at 1750°F. Assuming that bulk of the casting is such that a flask temperature of 1100 or 1200°F would be acceptable, the same flask temperature obviously would not provide proper solidification of aluminum, which melts at 1100 to 1200°F. For this particular metal, the flask temperature would be too hot.

Bulk of the metal to be cast also is important. If a very thin section of metal is to be produced in the casting, a greater heat will be required to produce the proper amount of flow into the thin section. High temperatures are undesirable, as well as unnecessary, however, in producing bulky castings. Much more cooling time is required for a greater bulk of metal, and porosity probably would result if the bulky casting were exposed to the same temperature as the thin casting.

Melting the Metals: A variety of methods are available for melting metals to be used in precision casting. Special treatment to prevent oxidation is required by some metals and alloys. The melt may be made under a nitrogen or helium atmosphere. It is advisable to melt the metal as quickly as possible if an atmosphere is not used. Amount of oxidation is increased by prolonged melting. At all times, temperature of metal should be carefully controlled to avoid overheating.

Soundness of the casting is affected by the temperature of the metal at the time it is introduced into the mold, especially with regard to its effect on proper solidi-

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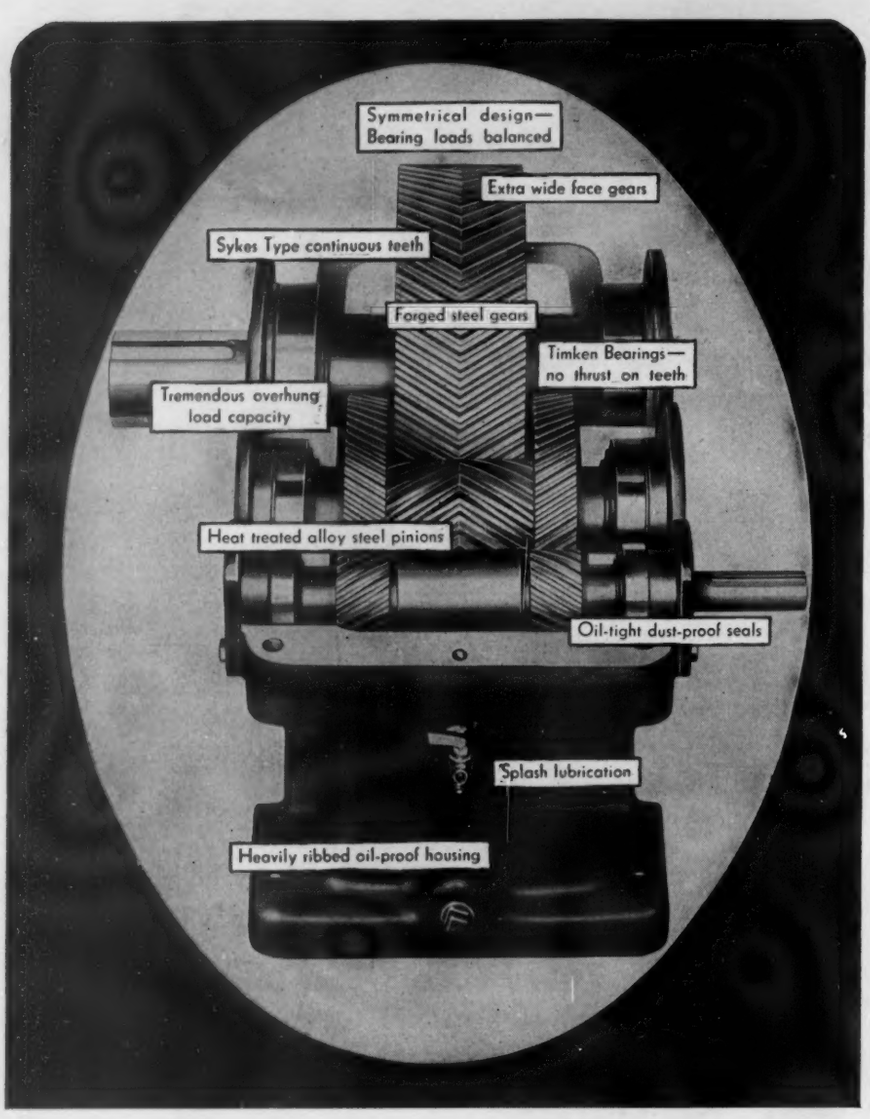

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fication. Overheated metal will require a prolonged cooling period in the flask, with the possibility that the metal may solidify first in the riser, resulting in porosity. Some of the essential elements of an alloy also may be burned out by overheating. Gates and risers from previous casting operations that are being remelted for reuse should be analyzed for any changes in alloy composition, and additions made to compensate for losses if changes are found to have taken place. Fig. 11 shows the casting crucible containing the molten metal being removed from an electric melting before insertion in the casting machine.

Casting: Casting immediately follows removal of the investment from the burnout furnace, as it is essential that the molten metal be poured before the flask drops in temperature. This prevents cracking due to excessive cooling, and also eliminates the possibility of inaccuracy in the casting due to a shrinkage of the investment upon cooling.

Two types of casting machines generally are employed, the air pressure type and the centrifugal type. Practice at Kerr has led to a preference for the centrifugal type, as it is believed that more satisfactory results are obtained when pressure is given to the weight of the metal by centrifugal force, rather than when some outside force is employed. Ultimate design of the machine naturally is largely dependent upon the type of casting to be done.

To cast the Army equipment part (See STEEL, Jan. 28, p. 116) at the Kerr plant, according to Mr. Lange, a vertical-tube type casting machine of the company's own design was employed. It is equipped with both speed controls and an automatic timer, and is constructed to utilize, as a casting crucible, the same crucible employed for melting the metal. The unit will hold approximately 5 lb or more of molten steel or its equivalent. In Fig. 12, a flask is being placed on top of a crucible of molten steel. Both crucible and flask then are locked into position in the tube, and the machine is set to revolve at any desired speed, from 1 to 600 rpm. This forces the metal from the crucible into the flask. The amount of force applied (through the number of revolutions per minute) depends upon the weight of the metal involved, its fluidity and the bulk of the part to be cast. Metals such as aluminum, which is light and "sluggish", require more pressure in casting. A complete fill-out for thin castings also requires a greater casting force.

Elimination of the casting crucible by the use of the special Kerr machine, states Mr. Lange, permits the metal to pass directly from the melting crucible

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into the flask. This avoids the dangers of oxidation or chilling that may be present when molten metal is poured through the air from ordinary casting crucibles.

Maximum speed should not be reached by the centrifugal casting machine until the metal has completely filled the mold. Initial shock of the molten metal against the investment also should be considered. If, for example, the same force (or speed) were applied to a thin aluminum casting as a heavy bronze casting, damage to the mold probably would result from the force of the entrance of the metal.

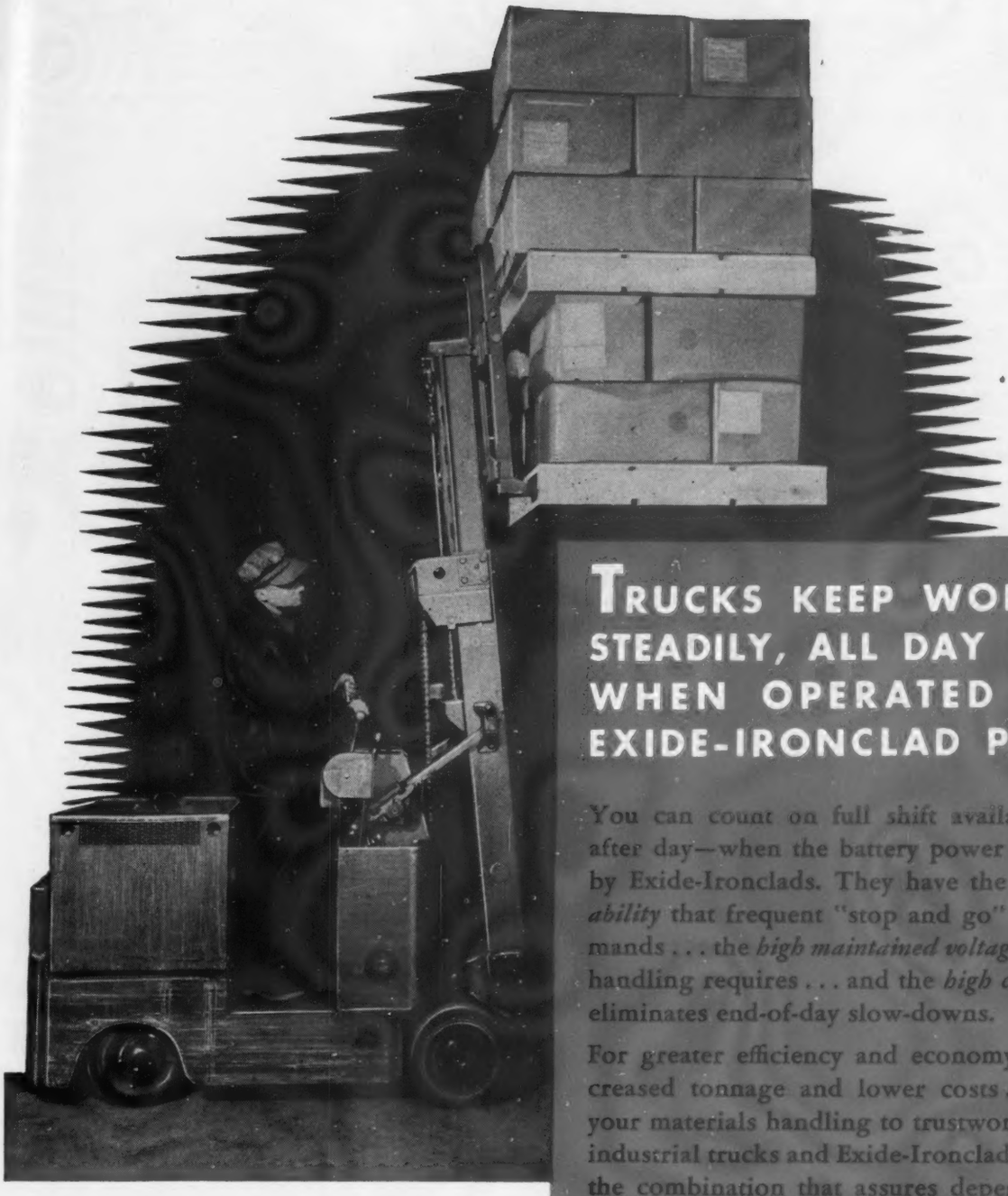
The centrifugal casting machine shown in Fig. 12 is an experimental model. Finished product, embodying the same principles, has instruments mounted flush in the cabinet, and incorporates other improvements.

Solidification of Metal: Pressure should be maintained after the metal has been cast in the mold until complete solidification has taken place. As previously stated, metal should solidify first at the far end of the mold, then back through the casting, through the gate, and into the riser, in that order. Solidification rate is directly influenced by flask temperature. Solidification will be retarded if the flask is overheated in relation to the metal being cast, or the bulk of metal involved.

Investment surrounding the casting is an ideal insulating material, and this results in a considerable difference between the cooling rate of the metal in the mold and that of the exposed riser. The riser, only partially enclosed by investment, tends to cool more rapidly. Primary cooling in the riser may draw on the fluid metal in the mold, resulting in shrinkage and porosity in the casting itself.

Cleaning the Casting: A plunger-type press usually is most effective for removing the bulk of the investment from the flask. Its speed prevents damage and distortion to the flask. When Cristobalite has been used, the investment then can be quickly broken away from the casting. A sand blast is one of the fastest and most efficient methods of cleaning away the investment. Experience at Kerr also has indicated that when an extremely fine steel grit is used in the sand blast, the surface of even a soft metal, like aluminum, will be very good. It may be necessary to remove the investment by steam pressure if an extremely smooth surface is required.

Removal of the gate and riser follows cleaning of the casting. This problem should be considered in designing the sprue, in order to facilitate quick and efficient disposal.



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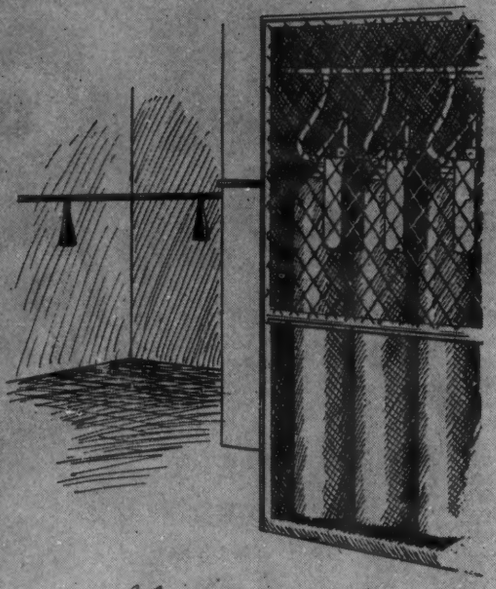

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Citizens Union

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'Officer' Scans

... stationed in a little town in France for several months, wooed a French girl by telling her about ... the ... int[o]

Magnesium Melting Pots

(*Continued from Page* 132)

Process 45, developed by Metallizing Engineering Co. Inc., Long Island City, N. Y. This provides maximum protection against heat oxidation and practically inhibits scale formation. Pots first are grit blasted to remove all rust, dirt, and to soften the contours of any surface irregularities. Once the pot is cleaned, care is used to prevent undue handling, in order to keep off grease or other contamination which might prevent proper adherence of the subsequent coating. Pot now is systematically covered by spraying on a coating of a special chromium-nickel alloy to a thickness of approximately 0.015-in. as shown in Figs. 1 and 2. Pure aluminum then is applied by metallizing on top of the chromium-nickel coating. Next, a special sealer is applied by spray or brush over the aluminum. No heat treatment is required, since first heat of the part will cause alloying.

Service Life: In service, each melting pot is connected to a Wheelco indicating and recording instrument by a thermocouple in continuous operation. Thus is provided a true heating record from start to completion of each 600-lb melt. Also obtained is a time-temperature indication of the thermal conditions affecting the pot.

Periodically, after each 200 hr heating, every pot is removed from its furnace setting and rigidly inspected before resetting. This operation becomes tiresome until at least 1500 hr heating elapses, because no ill effects are evident. At 2000 hr, the surface shows small wrinkles with slight depth of carbide formation (Fig. 3), and, although the processed pots appear to be good for a further service period of at least 1000 to 1500 hr, they are taken out of service for hammer and metallurgical test. If proven sound, they are returned for a reconditioning treatment, which consists of grit blasting the areas that show tendency to oxide or carbide formation, and recoating with Process 45, previously described.

Comparative Life Data: To illustrate fully the life expectancy of a processed pot in contrast to a pot not processed, the following data from technical records provide an illuminative contrast:

POT A

Used as received	
Weight of pot	2000 lb
Hours (above 1000° F) in use	456
Cost of pot, including freightage	$251.50
Working life of pot	456 hr
Weight of scale recovered from furnace setting and from pot surface	225 lb
Cost-per-hour, per lb of pot weight	55c
Dimensional change exterior length	30.5 to 32 in.

POT B

Metcolize Process No. 45	
Weight of pot	2000 lb
Hours (above 1000° F) in use	2006

on

TRIPLEX CAP SCREWS

TRIPLEX quality Cap Screws are now available in all diameters up to 1" and lengths up to 8".

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TRIPLEX THREADED FASTENERS
CAP AND SET SCREWS · BOLTS, NUTS AND RIVETS

PROFIT IS NO SIN

Where do the taxes that support our Government come from? Only one source—Profit.

Where do our colleges, universities, hospitals and libraries get their endowment? One major source —Profit.

Where does industrial growth get its finances, and the research that is behind that growth? Only one source—Profit.

What is the one thing that induces people to risk their savings to finance *all* industrial development? Isn't it the expectation of Profit?

Isn't it true that the only thing our "liberals" have to be liberal with is the Profit earned by others? What else is there to divide?

Destroy Profit and you destroy everything that makes our American way of living the best the world has ever known.

Profit is not the great sin. It is the great inspiration.

Geo. P. Trundle Jr.
President

This organization of over a hundred trained engineers has twenty-seven years of consulting management engineering experience. We invite you to write for more information, or to request a personal interview in your office.

THE TRUNDLE ENGINEERING COMPANY
Cleveland, Ohio, Bulkley Building
CHICAGO, City National Bank Building, 208 S. LaSalle Street
NEW YORK, Graybar Building, 420 Lexington Avenue

Cost of pot including all freightage	$268.50
Cost of Process 45	$103.85
Working life of pot	2006 hr
Weight of scale recovered from furnace setting and from pot surface	Zero
Cost-per-hour, per lb of pot weight	$.1357
Dimension change exterior length	30.25 to 30.5 in.

Both of these pots are of identical formula, from the same supplier, and of like weight, capacity and overall dimensions. Pot A was purposely employed in the melting department as a comparison and a check on the value of the process.

Pot A was retired from the magnesium department after the period indicated, and relegated to aluminum melting, a less hazardous assignment.

Pot B is the pot illustrated in this article. It was returned to the Metallizing Engineering Co. Inc., for reconditioning after 2000 hr actual service, with the expectation of a further 1500-hr life.

Of the metallized pots used by Manhattan, all have shown consistent quality and similarity of performance. Some of the earlier processed pots had riser stubs near the lower portion of the pot, cut off 1 in. or so above the pot contour. These provided focal points of heat concentration, tending after 1500 hr of service to build up scale. But as the riser stubs provided extra thickness at these points, the matter did not prove serious, although clean contours are desirable.

Water-Cooled Skid Pipes Kept Free of Scale

Excessive scale formation in the skid pipes of a billet heating furnace arising from the cooling water has an important bearing on steel production, since it frequently results in shutting down the furnace. In this type of furnace the billets are shoved along horizontal skid pipes which at furnace operating temperature, 2100° F, would soon burn the skids if water were not forced through them constantly. However, as the skid pipes become scaled the water flow diminishes, the skid pipes overheat and fail and the furnace has to be shut down while replacement is made.

Before water treatment was started at a western steel plant the average life of the skid pipes was four to five months. A section of one which lasted the unusually long time of 8½ mo is shown in the accompanying illustration. The heavy layer of calcium carbonate scale deposited from the water which caused overheating and failure is readily apparent. For comparison, another skid pipe in use in the same furnace but after having been treated by a process developed by Calgon Inc., Pittsburgh, is shown in lower view. This skid pipe was new when installed and the test

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● Murex aluminum bronze and phosphor bronze electrodes are now available!

This recent addition to the Murex line provides a group of electrodes for which you will find many uses. Providing bronze alloy deposits in a wide range of chemical analyses and mechanical properties, they have many applications in building up bearings, fabricating bronze and brass parts, welding high alloy steels, and joining dissimilar metals. The following six electrodes comprise the group:

Murex Type A B 12... aluminum bronze electrode with average Brinell of 120. Corrosion-resistant with exceptional "hot ductility"... it is well suited to arc welding of manganese bronze castings and brass sheets as well as to "arc brazing" of dissimilar metals. Permits welding without preheating.

Murex Type A B 16... aluminum bronze electrode with average Brinell of 160. Combines high ductility with resistance to shock or impact. Easily machined... excellent for bearing surface repair.

Murex Type A B 20... aluminum bronze electrode with average Brinell of 200. Designed to provide highest possible hardness and tensile strength without sacrificing ductility... particularly adapted for machine parts subject to severe treatment as well as equipment for use in corrosive services.

Murex Type A B 25... aluminum bronze electrode with average Brinell of 250. Intended for overlay applications where high hardness is necessary to withstand extreme wear.

Murex Type A B 30... aluminum bronze electrode with average Brinell of 300. Employed for overlaying dies for forming and drawing operations on carbon and stainless steels. Eliminates scratching and galling of work.

Murex Type P B 57... phosphor bronze electrode with average Brinell of 71. Extremely versatile in application... recommended for high speed, high quality, all position welding of bronzes, brasses, copper, steel and cast and malleable iron.

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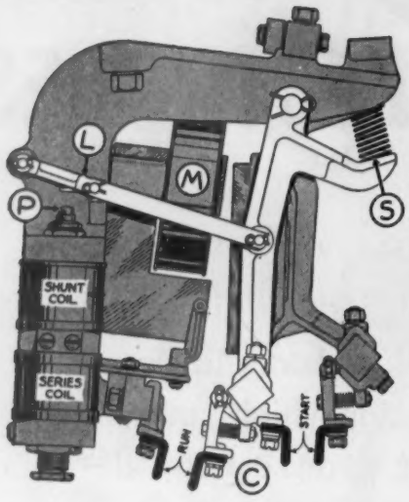
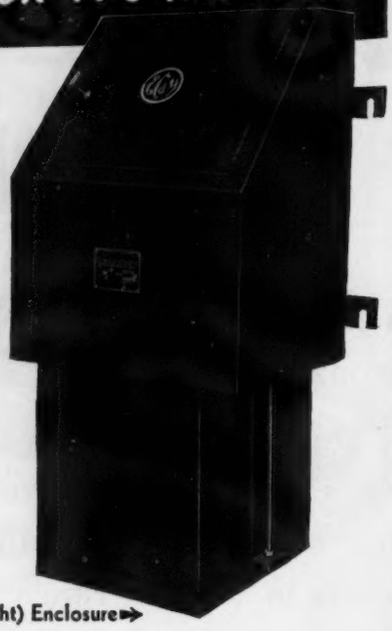




Standard (Semi-Dust-tight) Enclosure➡

For reduced voltage starting of 220-550 volt squirrel-cage motors these EC&M auto-transformer starters have a reputation for low up-keep cost throughout industry.

As illustrated above, the mechanism is a single, quick-break, double-throw Contactor (C), operated by a single Magnet (M), a throw-over Spring (S) and a mechanical Latch (L) tripped by plunger (P) which is raised by a current-limit relay to cause transition from reduced voltage starting to full voltage running.

Arranged for wall mounting with contactor oil-immersed in removable tank, the auto-transformers and thermal Overload Relays are mounted in the upper part of the case. Unlike conventional thermal relays, this device is of the hot-wire expansion type. It is set to trip at a low value of current above normal full load motor current for accurate overload protection. This can be done without false tripping during the starting period, because the wire is protected from high starting currents by current transformers.

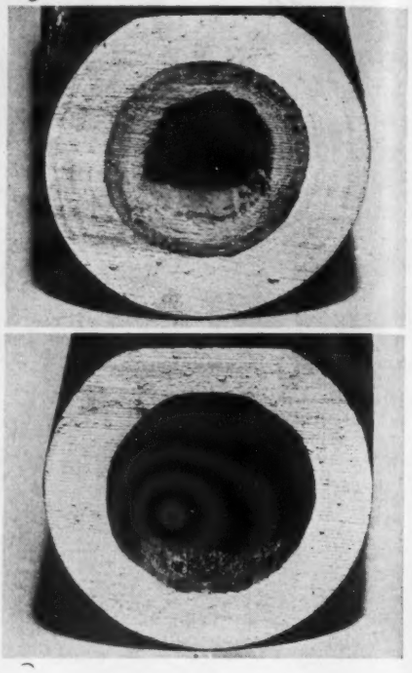
Bulletin 1045-B gives complete ratings and dimensions and also lists three larger sizes of starters for 220-550 volt motors. Write for your copy.

⬅Type VIII Enclosure for Class 1, Group D Hazardous Locations

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79th STREET • CLEVELAND 4, OHIO

showed that it was clean and free after a service of 8 mo.

The process commonly called Threshold treatment employs minimum amounts of the chemical Calgon, a glassy sodium phosphate. At the western plant only 1 lb of this chemical to 40,000 gal water



is used. The process also finds use in open-hearth door frames, piping and spray pond system; and in the power and petroleum fields to prevent scale in condensers, intercoolers and throughout the cooling system.

Stainless Rivet Stands Temperature Extremes

Development of a special Rivnut fastener of stainless steel is reported by B. F. Goodrich Co., Akron. O., It was developed to meet a need for a stainless steel which would withstand the extreme temperature differences in a gas chamber, withstands 1300° F, while the other end of the same rivet, in the cold air chamber, is subjected to temperatures as low as minus 68° F. Fastener can be upset on standard Rivnut tools with a change of pull-up studs and anvils.

—o—

A 52-page book entitled "Over 7,000 Ways to Control Dimensions," has been released by Federal Products Corp., 1142 Eddy St., Providence, R. I. It lists over 100 representative air and electronic dial indicating gages which meet inspection needs involving dimensional control. Gages are illustrated by detailed diagrammatic sketches. There are practical dial indicator gage setups for angle, compressibility, concentricity, curvature, depth and various combinations of dimensions.

Problem ~~TROUBLE~~-SHOOTING *with* SEAMLESS STEEL TUBING

MACHINERY INDUSTRY
THE PROBLEM:
To make—for giant Harris-Seybold-Potter printing presses—a 6-foot ink roller, light enough for easy removal and handling, yet strong and precisely rigid for perfect control of ink distribution.
THE ANSWER:
OSTUCO Seamless Steel Tubing. Here are the light-weight strength, the uniformity and quality which meet the most exacting printing requirements. Interesting too is the fact that famous Harris-Seybold-Potter, customer since 1900, cuts roller manufacturing costs as much as 50% by using OSTUCO swaged tubing.

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Meet Philip Keller, of the machine shop, and a member of OSTUCO'S famous 50-Year Club. Loyal, skilled men like Keller, and their sons and grandsons, carry on a tradition of excellence at OSTUCO that dates back to the earliest days of tube-making in America.

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HEDLEY STREET & DELAWARE RIVER

Philadelphia, Pa.

Welder Control

(*Continued from Page* 118)

welding position within a tolerance of 10/1000-in. Guns come down, and 40 series welds are produced in 16-gage steel. Guns are raised while carriage moves to next weld position and control under moves to start position. Cycle is repeated until required number of double rows of welds have completed the assembly. Carriage moves through machine to unload assembly at rear. Total time for welding of each group of welds is only 15 sec.

Welding guns can be arranged in single or multiple rows, circles, steps, curves, etc., either closely spaced or spanning the full width of large panels. Individual timing of each welding gun permits spot welding of different thicknesses of metals during one complete operation. Thus, reinforcing sections, brackets, spacers and trim forms can be joined to a main panel using the most suitable type and thickness of metal for each.

Finish-Forming Action

Provision of integral clamping positions at proper locations in machines, plus positive clamping action of welding guns applying pressure on the work simultaneously, results in a finish-forming action that automatically compensates for variations in component parts.

Unit construction of the control (available in two sizes) permits combination of such units to accommodate as many welding guns as required for various assemblies. Each unit can be located close to the guns and the welding transformer it controls to reduce the size of the welding loop to a minimum and to provide maximum utilization of transformer capacity. Usual practice is to mount units so that they may be driven by a single motor through direct coupling. If required, units can be driven in tandem or even at right angles through gears or flexible shafts. A single motor control with reversing switch and plugging stop synchronizes operation of all units and prevents over-travel of carriages. One or more welding transformers can be used in connection with control units as required to weld heavy sections, make single or multiple series welds or even projection welds at one operation.

Control unit design incorporates numerous exclusive new features designed to assure dependability, accuracy, smooth operation, long life and a minimum of maintenance. Drive of carriage is centered between three hardened and ground guides to assure smooth traverse. Carriage rolls have antifriction bearings which carry both radial and thrust loads. Use of simple cams interposed between tap-

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pets actuating contacts assures complete opening of each welding circuit before next circuit can be closed. Thus, both weld time range of all welding circuits and maximum welding rate of the machine are increased. Engagement between heavy contact blocks and feed bars is at an angle to the direction of contact block motion. This provides a self-cleaning, wiping contact over a larger contact area than otherwise possible. A one-piece adjustable and easily removed feed bar on each side of the unit simplifies resurfacing and adjustment when necessary.

Dual equalizing spring supports for carriage rolls balance contact pressure of 1100 psi on both sides of the carriage. Feed bar is watercooled, the circuit giving maximum cooling near contact surfaces where most of heat is generated. Contact blocks are connected to gun cables through rigidly supported laminated shunts. This prevents transfer of cable kick to contacts. Auxiliary springs assure quick return of contact blocks. Timing plunger and parts comprising contact mechanism are located in the same plane for each gun. This prevents any overlapping of weld time of adjacent guns — eliminating dual-firing and burned contacts.

Problems and Issues of Collective Bargaining

Trends in Collective Bargaining, by S. T. Williamson and Herbert Harris; cloth, 254 pages, 6 x 9 inches; published by Twentieth Century Fund, New York, for $2.

This volume attacks the present explosive problem of labor-management relations by a calm appraisal of fact. It is based mainly on a comprehensive survey covering 16 major industries and summarizes for the general reader the rise and present scope of collective bargaining, the way it is conducted and leading issues and problems.

It presents a far-reaching program for strengthening the processes of collective bargaining proposed by the Fund's labor committee, consisting of leaders representative of union labor, management, government and the public.

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Under American practice of rolling practically any specification of strip can be met by a triple mill installation—a 24-in. unit designed to roll from 2 to 18-in. widths, a 56-in. unit for widths from 20 to 28 in. and an 80-in. mill designed to handle widths from 28 to 72 in. Such a combination of rolling units is capable of rolling close to 3,000,000 tons annually.

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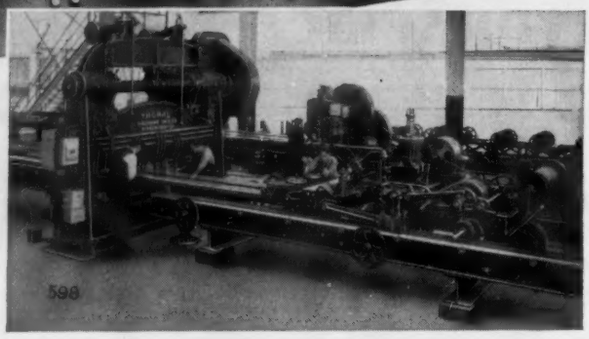

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Boiler Cleaner—Heatrex, a purgative for boilers, cleans without draining boiler or shutting off heat; corrects foaming, priming; dissolves oil, grease, rust, heat-resisting substances; and prevents scale formation, pitting, and corrosion of boiler surfaces and piping. Whiting Stoker Sales Co., 11 South LaSalle street, Chicago 11. ST421

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Cement — Resin-type cement, known as Pennsalt PRF, is a quick-setting, cold-hardening acid, alkali and solvent proof product composed of a liquid and a powder which, when mixed, react chemically to form a cement. It is designed for bonding corrosion-proof brick and tile where acid and alkalis are encountered. Pennsylvania Salt Mfg. Co., Philadelphia 7. ST412

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Dustproofer — For eliminating dust from cement floors, Synkrete, a concentrate diluted with three parts water, is applied by brush, mop, or sprinkler to saturate an area. It penetrates pores and reacts with cement to harden into a rock-like, impenetrable mass. Synthex Products Co., 2 West 45th street, New York 19. ST413

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Valve Lubricant—Its viscosity changing only slightly over a wide temperature range, colorless, silicone valve lubricant is recommended for working temperatures from 40 to 400° F. It does not evaporate appreciably even at elevated temperatures, and is available in soft bulk form for application by grease gun. Merco Nordstrom Valve Co., 400 Lexington avenue, Pittsburgh 8. ST406.

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Pre-Cleaner and Deoxidizers—For producing low surface resistance on aluminum preparatory to spot welding, aluminum pre-cleaner and deoxidizers offer smut-free surface, oxide removed using a cold solution, negligible weight loss, minimum machine adjustment, and minimum handling. Shop dirt, cutting oil, grease and identification paint are removed. Optimus Detergents Co., 176 Church street, Matawan, N. J. ST414

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Rust Inhibitors—For temporary rust prevention on metal materials, Carbo C inhibitor is inactive on all metals and alloys, including magnesium and aluminum. Carbo N has no effect on iron, steel or ferrous alloys, but acts slightly on softer metals, such as lead, zinc, magnesium and aluminum. They also can be mixed with cutting oils to protect threads from rust. Carbozite Corp.,

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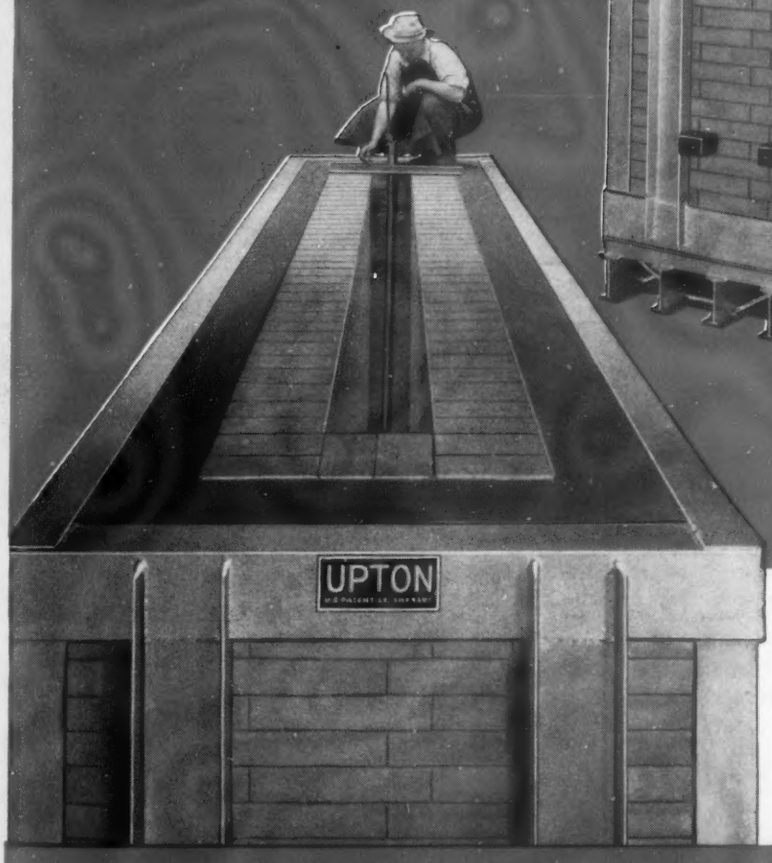
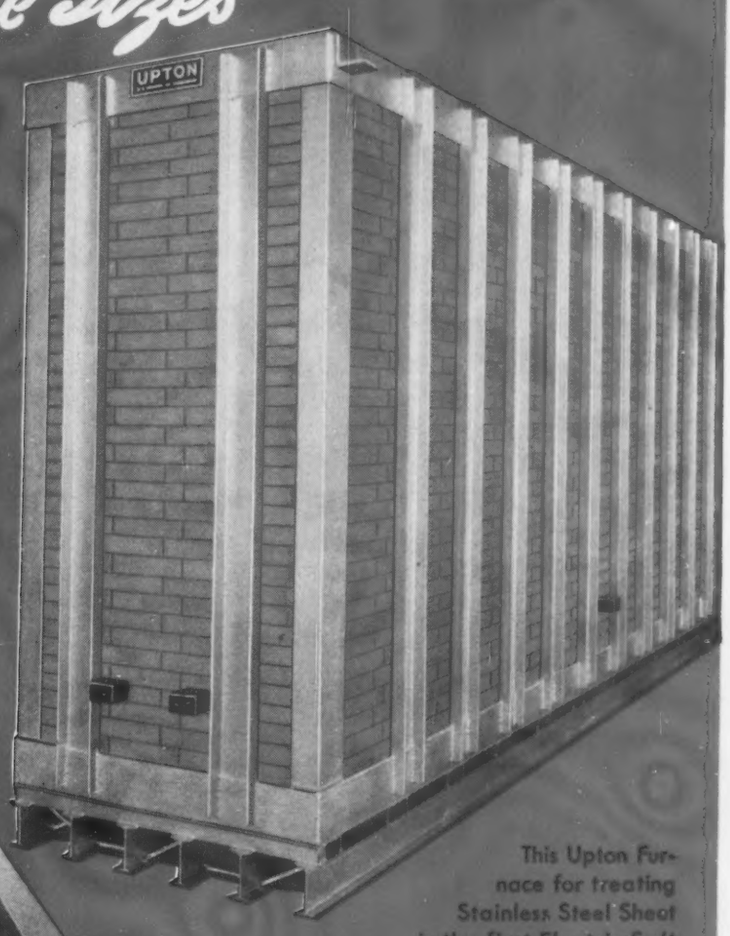
Salt Bath Furnaces have certain definite advantages that can not be duplicated with any other type of heat treating methods.

Upton Electric Salt Bath Furnaces, using the exclusive Sealed Electrode principle of heating the salt right at the bottom of the pot, are being built in unbelievable sizes.

Sealed Electrodes—guaranteed for the life of the furnace—need no changing, require no "down" time for changing.





This Upton Furnace for treating Stainless Steel Sheet is the first Electric Salt Bath Furnace of its size built anywhere. It is now in full operation and, like its size, is producing work of unprecedented excellence.

Sealed Electrodes in the Upton Furnace permit building a furnace for *your* work; as deep and as long as needed to accommodate the work and as narrow as permissible to cut radiation losses to a minimum.

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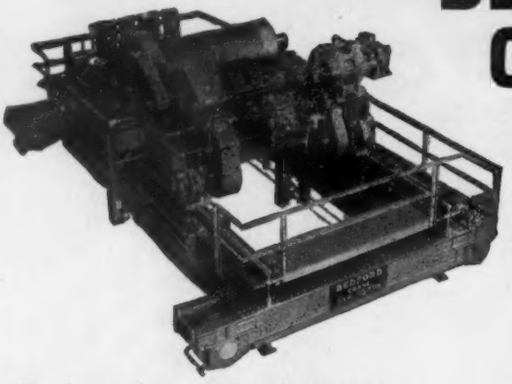

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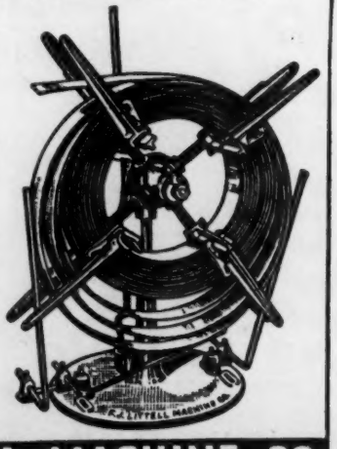
COIL stock, fed by LITTELL Automatic Centering Reels, insures efficient, fast, accurate, economical production. It permits continuous feeding, prevents waste of material and provides automatic roll feeding direct from coils.

LITTELL Reels automatically center coils. Ball bearing, they are easy running and insure free-moving coils for accurate feeding. Adjustable stock support holds up loose loops of coils and permits very light brake adjustment.



Plain and motor-driven types. Capacities, 300 to 6,000 lbs. Coil Cradles can be supplied for coils up to 20,000 lbs.

LITTELL also makes Roll Feeds, Dial Feeds, Feeding and Straightening Machines, Scrap Winders, Air Blast Valves, Pres-Vac Safety Feeders and Mechanical Pickers.

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4165 RAVENSWOOD AVE., CHICAGO 13, ILL.

First National Bank Bldg., Pittsburgh 22. ST410

—o—

Safety Spectacles — Designed to fit every face, spectacles feature plastic rocker nose pads which are self-adjusting to bridge and adjustable cable temples. Lenses are heat treated, tested individually for impact strength and optical clarity, and frames are reinforced. Willson Products Inc., Reading, Pa. ST426

—o—

Tire Paint—Up to 9 gal of black tire paint can be obtained from 1 gal of concentration when mixed with gasoline. Uses include: Application to tires after repairs or recapping to restore finish; to touch up tires after wash or wax jobs; and to improve appearance and lengthen life of floor boards and running board matting. B. F. Goodrich Co., Akron. ST405

—o—

Liquid Dyes—For dyeing lucite, plexiglas, polyvinyl chloride, acetate and other plastic materials, Krieger-O-Dip "W" dies are used in water heated to 200° F, approximately 1 gal of concentrate making from 8 to 10½ gal of dye solution. Krieger Color & Chemical Co., 6135 Santa Monica boulevard, Hollywood 38, Calif. ST373

—o—

Capacitor Dielectric — Available in thicknesses of ⅛ to 1 in., in 14 x 18-in. sheets, thicknesses down to 1/32-in. in smaller sheets, and 14 to 18-in. rods, ¼ to 1 in. in diameter, Mycalex K offers selective range of dielectric constants, from 8 to 15 at one megacycle. Can be molded with incorporation of metal electrodes or inserts where desired. Mycalex Corp. of America, Clifton, N. J. ST368

—o—

Saw-Tooth Lubricant — Lubricating stick 6 in. long and 1 in. in diameter is applied to teeth of band saw blade while in motion. Said to make cutting easier and faster and to increase saw blade life in metal cutting. Prevents chips from clogging teeth. Prevents pitch from forming on saw blade of wood-cutting saw. Kindt-Collins Co., 12651 Elmwood avenue, Cleveland. ST371

—o—

Arc-welding Electrode—For flat and horizontal fillet welding and for flat butt welding, electrode has high melting rate. Operates on alternating or direct current with straight or reverse polarity. It is available in three sizes: 1/16 x 18 in., ¼ x 18 in., and 1/8 x 18 in. Rated A.W.S. classes E6020 and E6030. General Electric Co., Schenectady 5, N. Y. ST364

Needle bars on hosiery knitting machines reciprocate over a complicated figure 8 course . . . and at split-second speeds. Weight of the bars is an important factor, therefore, in the machines' performance. Making them of lightweight Mazlo Magnesium permits increased knitting speeds, more production and superior products.

In tricot knitting machines, Mazlo Magnesium extrusions are being used in seven and fourteen foot lengths for needle, presser, sinker and guide bars, and many other places in the knitting action. Light in weight, vibration is reduced to a minimum . . . higher speeds are attained . . . service life is long.

May we assist you in determining where American Magnesium products can be used to best advantage in your textile equipment. Write Aluminum Company of America, Sales Agent for American Magnesium Products, 1721 Gulf Building, Pittsburgh 19, Penna.

MAGNESIUM MAZLO PRODUCTS

AMERICAN MAGNESIUM CORPORATION

SUBSIDIARY OF ALUMINUM COMPANY OF AMERICA

the BUSINESS TREND

FIRST six days of the nationwide steel strike caused a 39-point plunge in STEEL's industrial production index. From 117 per cent in the week ended Jan. 19 STEEL's index nose-dived to 78 per cent (preliminary) in the week ended Jan. 26. Previous low point since V-J Day was 98 per cent registered in the Christmas holiday week ended Dec. 29.

Greatest part of the current drop results from reduction of steelworks operations to about 5 per cent of capacity, but reduced car loadings and electricity output also contributed to the decline.

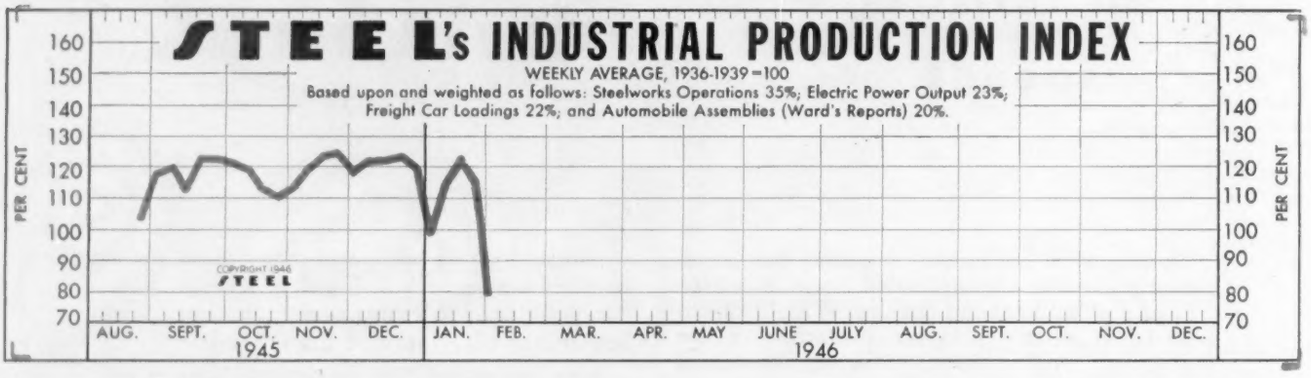
AUTOMOBILES—When the steel strike started, the automobile industry had sufficient materials and parts to increase car output slightly in the week ended Jan. 26. Auto production that week totaled 29,410 units, compared with 28,465 in the previous week.

PURCHASING POWER—While strikes have reduced the purchasing power of many people, weekly department store sales, sensitive indicators of ability to buy, continue to exceed those of a year ago. Even in Detroit, department store sales in all but three weeks since the General Motors strike started Nov. 21 have exceeded those of the corresponding weeks of a year ago. In the week ended Jan. 19, department store sales in the nation were 19 per cent above those of the like week a year ago. The increased dollar volume of sales results from several factors, including higher prices for merchandise, lack of lower-price goods but availability of higher-price items, pent-up demand, availability of savings from wartime wages, return of commodities scarce in wartime, and enlargement of the consumer group by return of war veterans.

BANK CLEARINGS—Also showing gains are total bank clearings for the nation's 24 leading cities. The total for each week thus far in 1946 has exceeded that of the corresponding week of a year ago.

RAILROADS—Ending of war brought an 8.2 per cent decrease in freight traffic handled by Class I railroads in 1945 compared with 1944. Advance reports indicate December railroad operating revenues decreased 18.7 per cent under the same month of 1944. Abandonment of 412 miles of unprofitable railroad lines in 1945 was the lowest since 1927, and continued the downtrend started after the record abandonment of 1942. However, the small mileage of abandonment in 1945 exceeded the 347 miles of new lines completed then.

CASTINGS—Shipments of 667,506 tons of gray iron castings in November were 2 per cent under October, but unfilled orders on Nov. 30 were 2,453,971 tons, or 2 per cent over those on Oct. 31 and only 10 per cent under the wartime peak of 2,713,656 tons at the end of March, 1945.



The Index (see chart above): Latest Week (preliminary) 78 Previous Week 117 Month Ago 98

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	5	70	65	93.5
Electric Power Distributed (million kilowatt hours)	4,040	4,145	3,759	4,577
Bituminous Coal Production (daily av.—1000 tons)	2,130	1,917	1,830	1,993
Petroleum Production (daily av.—1000 bbls.)	4,626	4,606	4,474	4,727
Construction Volume (ENR—Unit $1,000,000)	$101.4	$45.4	$26.3	$8.8
Automobile and Truck Output (Ward's—number units)	29,410	28,465	10,690	20,765

*Dates on request.

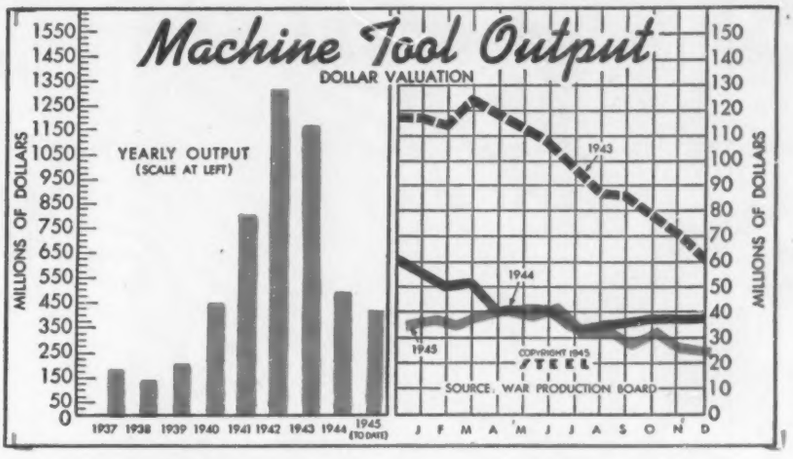
TRADE				
Freight Carloadings (unit—1000 cars)	734†	749	506	759
Business Failures (Dun & Bradstreet, number)	24	20	7	16
Money in Circulation (in millions of dollars)‡	$27,977	$28,119	$28,649	$25,175
Department Store Sales (change from like wk. a yr. ago)‡	+19%	+13%	+14%	+11%

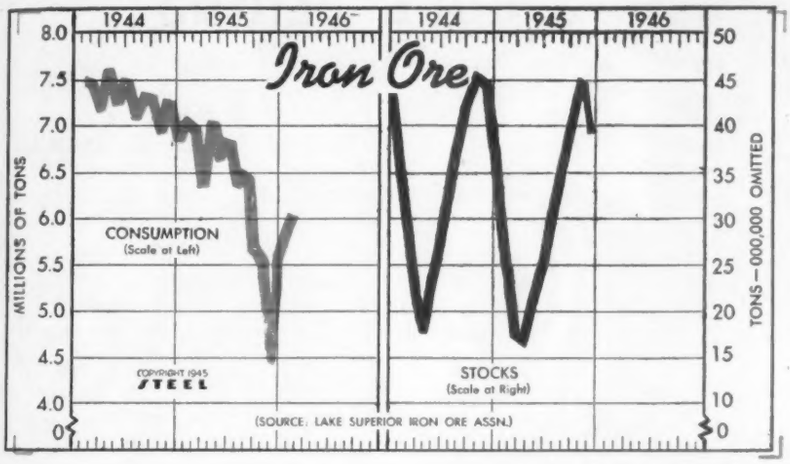
†Preliminary. ‡Federal Reserve Board.

Machine Tool Shipments

(000 omitted)

	1945	1944	1943	1942
Jan.	$37,353	$56,363	$117,384	$83,547
Feb.	36,018	50,138	114,594	84,432
Mar.	40,045	51,907	125,445	98,358
Apr.	40,170	41,370	118,024	103,364
May	39,825	41,819	113,859	107,297
June	41,040	41,471	108,736	111,090
July	32,504	32,753	97,541	113,596
Aug.	32,500	35,177	87,805	117,342
Sept.	27,300	35,889	85,842	119,883
Oct.	31,200	37,516	78,302	130,008
Nov.	26,084	36,277	71,811	120,871
Dec.	23,276	36,784	60,873	131,960
	$407,315	$497,464	$1,180,216	$1,321,748





Iron Ore

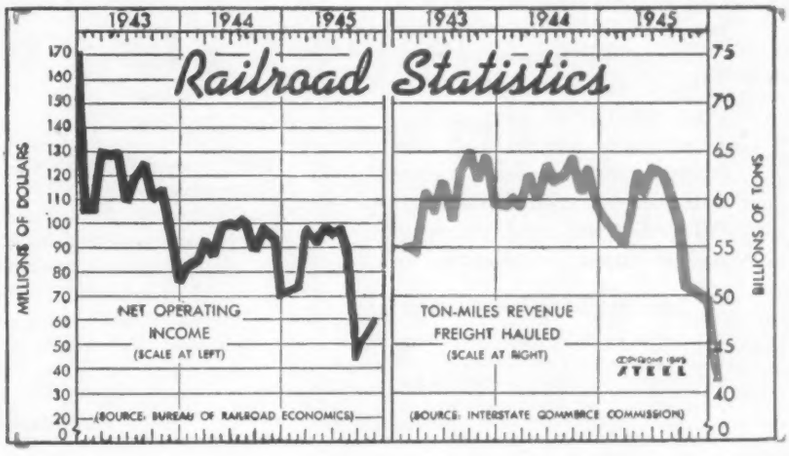
(Lake Superior Iron Ore Assn.)

Gross Tons—000 omitted

	Consumption		Stocks at Lake Erie docks and furnaces	
	1945	1944	1945	1944
Jan.	6,983	7,482	30,889	36,059
Feb.	6,371	7,207	24,577	28,910
Mar.	7,082	7,659	17,304	21,333
Apr.	6,642	7,273	16,429	17,892
May	6,872	7,558	20,715	21,474
June	6,397	7,112	24,847	26,655
July	6,532	7,372	29,485	32,069
Aug.	5,658	7,342	34,781	37,243
Sept.	5,837	6,950	39,549	41,943
Oct.	4,491	7,320	45.090	45.343
Nov.	5,611	6,883	44,706	44,722
Dec.	6,099	7,090	39,059	37,824
Total	74,576	87,247	.....	.....

Statistics of Class I Railroads

	Net Operating Income			Ton-Miles Revenue Freight		
	1945	1944	1943	1945	1944	1943
	(millions)			(billions)		
Jan.	$73.0	$84.9	$105.3	56.8	60.5	55.1
Feb.	73.2	84.5	105.8	55.3	59.3	54.4
Mar.	99.9	92.5	129.7	62.9	62.7	61.2
Apr.	91.9	87.7	128.7	61.6	60.4	59.1
May	99.9	98.5	129.5	64.6	64.0	62.1
June	96.1	99.8	109.0	63.6	62.0	58.0
July	97.1	98.6	127.8	60.1	62.8	63.7
Aug.	86.7	101.4	132.3	56.4	64.5	65.1
Sept.	44.0	89.1	110.3	52.2	61.0	62.5
Oct.	54.4	97.3	113.1	51.5	63.5	65.0
Nov.	61.3	91.6	96.4	50.0	59.4	59.9
Dec.	...	69.8	76.9	42.5	57.3	60.6
Ave.	...	$91.3	$113.7	56.5	61.5	60.6



FINANCE

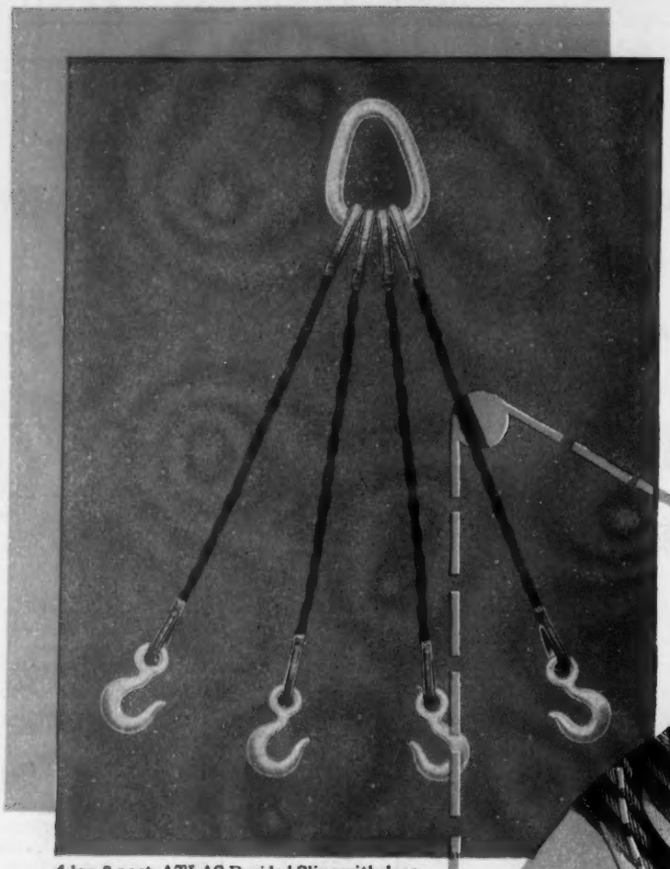
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,527	$12,758	$9,599	$11,119
Federal Gross Debt (billions)	$278.6	$278.0	$278.4	$233.3
Bond Volume, NYSE (millions)	$35.3	$51.7	$19.9	$58.4
Stocks Sales, NYSE (thousands)	10,142	14,668	4,388	6,818
Loans and Investments (billions)†	$68.2	$67.8	$68.1	$59.6
United States Gov't. Obligations Held (millions)†	$49,629	$49,133	$48,827	$44,393

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$57.55
All Commodities†	106.7	106.7	106.8	104.8
Industrial Raw Materials†	118.7	119.0	119.8	115.8
Manufactured Products†	102.9	102.8	102.6	101.6

†Bureau of Labor Statistics Index, 1926 = 100.



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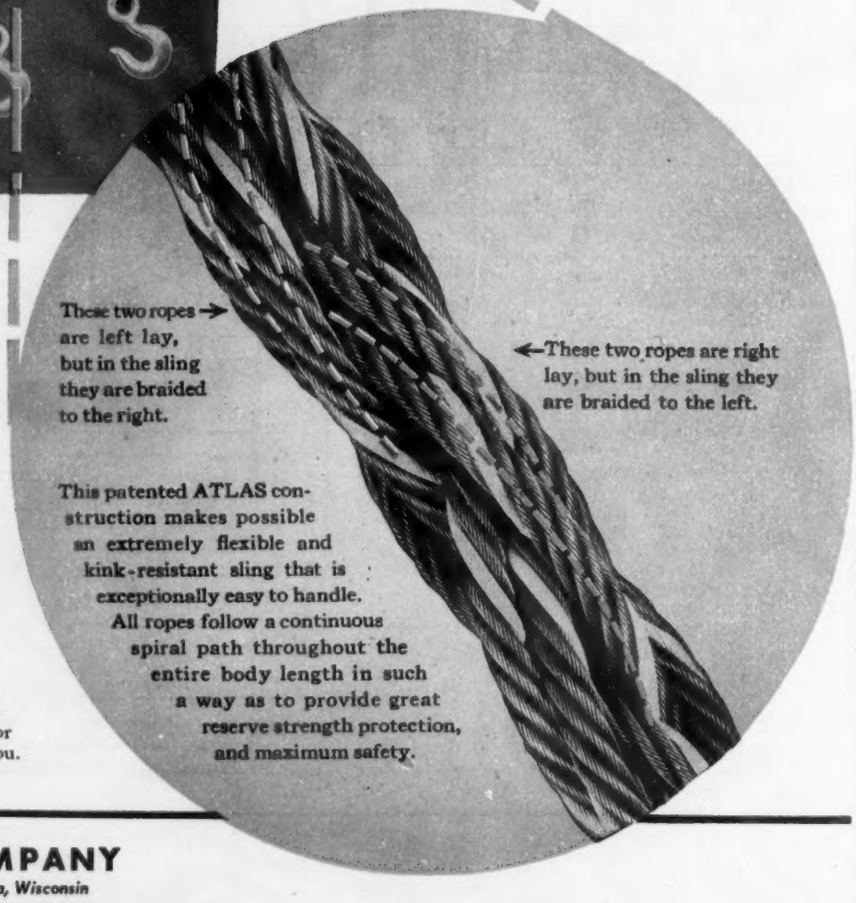
These two ropes → are left lay, but in the sling they are braided to the right.
←These two ropes are right lay, but in the sling they are braided to the left.
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MARKET SUMMARY

Steel Users Continue To Seek Place on Mill Books

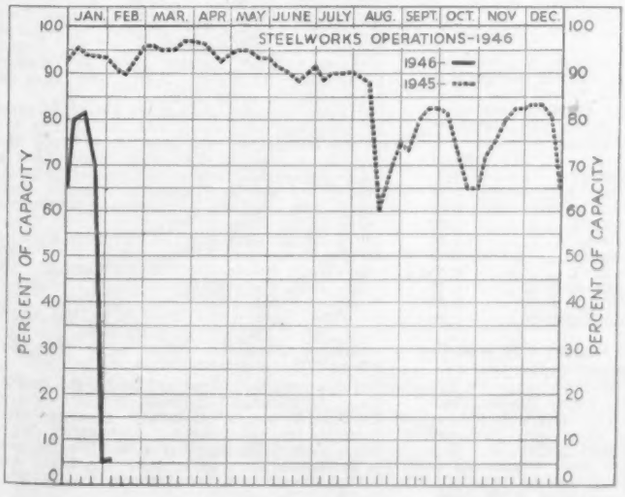
Lack of delivery promise no deterrent . . . New basing point on tin plate . . . Operations still near bottom . . . Raw materials scarce

STEEL inquiry has been fairly sustained at the sharply reduced rate that developed after the steel strike started, with consumers continuing efforts to get on mill books, regardless of producers' inability to promise anything like definite shipping schedules.

Meanwhile, consumers' inventories are shrinking and metalworking operations are declining at accelerated rate. Sheet mills selling on a quarterly basis are being pressed by many customers for word on second quarter quotas. Sellers still find it impossible to give any ideas as to what they will be able to provide, except to point out that tonnage carried over from the present quarter will have preference and that they have no way at present of knowing what that will be.

Also unsettled is the tonnage of export steel they will have to accept under government directives when the labor situation is stabilized. The entire program for exporting about 850,000 tons of steel during first half under government directives to countries in urgent need of rehabilitation has been canceled. Whether the program will come up for review after the steel strike remains to be seen. However, it seems certain the program will be drastically reduced if it is set up again. It originally involved 929,700 tons, including 215,500 tons of tin plate, 185,000 tons of bars, 150,000 tons of sheets and strip, 138,000 tons of wire products, 132,500 tons of shapes, 95,000 tons of sheet bars and 12,700 tons of pipe. The total later was reduced to 850,000 tons and quotas were to have been set up by an industry advisory committee on the basis of estimated production for first half. Only quotas set were on tin plate when the steel strike intervened.

There is little likelihood of hot-rolled carbon bar tonnage being scheduled before well into third quarter for large sizes and fourth quarter in small sizes.



DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended Feb. 2	Change	Same Week 1945	Same Week 1944
Pittsburgh	1.5	None	87.5	100
Chicago	5	+0.5	99.5	102.5
Eastern Pa.	4	None	93	94
Youngstown	0	None	80	96
Wheeling	56	None	97.5	102
Cleveland	0	None	79.5	92
Buffalo	0	None	43	88.5
Birmingham	0	None	95	95
New England	10	None	94	95
Cincinnati	44	None	95	84
St. Louis	19	+5	75	83
Detroit	32	+1	87	91
Estimated national rate	5.5	+0.5	91	100

*Based on steelmaking capacities as of these dates.

Steelmaking operations last week were little changed from the prior week, showing a raise of ½-point to 51½ per cent of capacity on slight increases at three points. For the most part conditions were unchanged. St. Louis gained 5 points to 19 per cent, Chicago ½-point to 5 per cent and Detroit 1 point to 32. Operations were entirely suspended at Cleveland, Birmingham, Buffalo and Youngstown. New England continued at 10 per cent, Pittsburgh at 1½ per cent, Wheeling at 56, Cincinnati at 44 and eastern Pennsylvania at 4.

Bethlehem Steel Co. has made Sparrows Point, Md., a basing point on tin plate, at $5.10 per base box, following similar action in January by Tennessee Coal, Iron & Railroad Co. in making Birmingham a base on tin mill products. This is 10 cents higher than the base at Pittsburgh and Gary and the same as the Granite City, Ill., base.

Pig iron supply is small, although a few blast furnaces not connected with steel plants continue production. The steel strike has affected some foundries and iron usually sent to them is available for shipment to other melters. Foundries are operating mainly on inventory, which will be exhausted before long if the steel strike continues. Pig iron supply is being stretched where possible by larger use of scrap, but foundry scrap is tight and this plan will not serve to maintain operations for long.

Scrap continues scarce and steelmakers, even where strike-bound, continue to take all tonnage offered, as far as they are able to arrange storage. Railroads in some cases have placed embargoes to prevent cars being idled under demurrage. In some cases arrangements have been made for unloading cars at struck plants, on others scrap is being placed in storage yards apart from plants and some scrap dealers are storing material in their yards ready for shipment when possible. Heavy needs as soon as the strike ends is behind such arrangements.

Average composite prices of steel and iron products are unchanged at Office of Price Administration ceilings. Finished steel composite is $58.27, semifinished steel $37.80, steelmaking pig iron $24.80 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Feb. 2	Jan. 26	Jan. 19	One Month Ago Jan. 1946	Three Months Ago Nov. 1945	One Year Ago Feb. 1945	Five Years Ago Feb. 1941
Finished Steel	$58.27	$58.27	$58.27	$58.27	$58.27	$57.55	$56.73
Semifinished Steel	37.80	37.80	37.80	37.80	37.80	36.00	36.00
Steelmaking Pig Iron	24.80	24.80	24.80	24.80	24.25	23.55	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	20.05

Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite: —Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; other, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago

Finished Material	Feb. 2, 1946	Jan., 1946	Nov., 1945	Feb., 1945
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.15c
Steel bars, Philadelphia	2.57	2.57	2.57	2.47
Steel bars, Chicago	2.25	2.25	2.25	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.25	2.25	2.20
Plates, Philadelphia	2.30	2.30	2.30	2.25
Plates, Chicago	2.25	2.25	2.25	2.20
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.20
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.70	3.65
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.20
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.70	3.65
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.75	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.90	2.90	2.80

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$36.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	36.00	34.00
Rerolling billets, Pittsburgh	36.00	36.00	36.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.15	2.15	2.15	2.00

Pig Iron	Feb. 2, 1946	Jan., 1946	Nov., 1945	Feb., 1945
Bessemer, del. Pittsburgh	$26.94	$26.94	$26.19	$25.69
Basic, Valley	25.25	25.25	24.50	24.00
Basic, eastern del. Philadelphia	27.09	27.09	26.34	25.84
No. 2 fdry., del. Pitts., N.&S. Sides	26.44	26.44	25.69	25.19
No. 2 foundry, Chicago	25.75	25.75	25.00	24.50
Southern No. 2, Birmingham	22.13	22.13	21.38	20.88
Southern No. 2 del. Cincinnati	26.05	26.05	25.30	24.80
No. 2 fdry., del. Philadelphia	27.59	27.59	26.84	26.34
Malleable, Valley	25.75	25.75	25.00	24.50
Malleable, Chicago	25.75	25.75	25.00	24.50
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.94	25.94	25.19	24.69
Ferromanganese, del. Pittsburgh	140.00	140.00	140.33	140.33

Scrap				
Heavy melting steel, No. 1, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.45	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace ovens	$7.50	$7.50	$7.50	$7.00
Connellsville, foundry ovens	8.25	8.25	8.25	7.75
Chicago, by-product fdry., del.	13.35	13.75	13.75	13.35

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941 revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.

(Empire Sheet & Tin Plate Co., Mansfield, O. may quote carbon steel ingots at $33 gross ton, f.o.b. mill.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bll) $38; Pac. Ports, (bll) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co. $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42, Detroit, del. $44; Duluth, billets, $44; forg. bll. f.o.b. Pac. ports, $54.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co. $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18-in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54, del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 5—$\frac{1}{4}$ in. inclusive, per 100 lbs., $2.15 Do., over $\frac{1}{4}$—$\frac{47}{64}$-in., incl., $2.30; Galveston, base, $2.25 and $2.40 respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.05 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3: Pittsburgh, Youngstown, Chicago Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c, (Calumet Steel Division. Borg-Warner Corp., and Joslyn Mfg. & Supply Co., may quote 2.55c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons. (Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.35c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit del., 2.80c. (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		4100 (.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

* Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.94c; Phila. del. 3.78c; Pacific ports 4.25c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron, 3.90c; pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20 gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	....
65	7.25c	8.00c	....
58	7.75c	8.50c	....
52	8.55c	9.30c	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c.

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City, Birmingham, Sparrows Point, $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.25 lb. tin, $4.35; 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65; Granite City, Birmingham, Sparrows Point, $4.45, $4.60, $4.75, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, Birmingham, Sparrows Point, 3.15c; Pacific ports, boxed, 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City, Birmingham, Sparrows Point, $4.40.

Plates

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. 12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c; Gulf ports, 3.85c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c; Gulf ports, 2.45c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.45c, Bethlehem, Pa., on the general range and 2.55c on beams and channels from 4 to 10 inches.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.40c; Pacific ports, 2.95c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham to manufacturers in carloads.

Bright, basic, bessemer wire *$2.75
Spring wire ..... *†$3.30

Wire Products to the Trade:

Standard and cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, $2.90; Pac. ports, $3.40; galvanized, $2.55 and $3.05, resp.

Annealed Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.20

Galvanized Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.55

Woven fence, 15½ gage and heavier, per base column 87

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 72; twisted barbless wire, column 72.

*Add $0.10 for Worcester, $0.05 for Duluth; add $0.50 for bright, annealed, agivanized and $0.70 for other finishes for Pacific ports.

† Same bases as for bright basic except Birmingham.

†† Add 10 cents for Worcester; 50 cents for annealed, bright basic and 70 cents for all other finishes for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

Steel			Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	56	33	⅛	24	3½
¼ & ⅜	59	40½	¼	30	10
½	63½	51	⅜	34	16
¾	66½	55	½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

Steel			Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½-3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b.f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

		—Seamless—		—Lap Weld—	
O.D. Sizes	B.W.G.	Hot Rolled	Cold Drawn	Steel	Charcoal Iron
1"	13	.....	$ 9.01	.....	.....
1¼"	13	.....	10.67	.....	.....
1½"	13	$10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., .fo.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Base, per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	3	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.80	30.80	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§18.00	19.00	.....	.....

*With 2-3% moly. §With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Rivets, Washers

Birmingham

F.o.b. Pittsburgh, Cleveland, Chicago

Structural	3.75c
⅞-inch and under	65-5 off
Wrought, Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller	65¼ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-inch and less	62	64
⅛-1-inch	59	60
1¼-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10 smaller	70 off

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the some designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extra mean additions or deductions from **Extra** mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prces, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terns plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

*Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 26, 1945.

†14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.80c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$20.00

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.244[11]	4.715	6.012[23]	6.012[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[16]	4.872[25]	4.172[21]	4.772	5.816[23]	5.360[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.152[25]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.141[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.265[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[16]	4.40[10]	3.85[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[16]	4.30[10]	3.75[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[12]	4.40[24]	3.85[25]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[12]	4.30[24]	3.75[25]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.85[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	..	4.30[24]	3.75[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[24]	3.900[21]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.043[1]	4.093[1]	4.093[1]	5.693[1]	3.793[1]	4.143[1]	4.143[1]	5.615[12]	5.443[24]	4.543[12]	.....	.....	.....
Omaha (country, base)	3.943[1]	3.993[1]	3.993[1]	5.593[1]	3.693[1]	4.043[1]	4.043[1]	5.515[12]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[24]	4.111[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[12]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[16]	4.20[24]	3.85[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[16]	4.337[24]	3.987[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[16]	4.568[24]	4.08[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[9]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.461[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[12]	5.172[15]	4.347[24]	4.131[21]	4.931	6.131[23]	6.281[23]
Memphis, Tenn.	4.015[3]	4.065[3]	4.065[3]	5.78[3]	3.965[3]	4.215[3]	4.215[3]	5.265[15]	4.78[24]	4.43[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.64	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[26]	5.079[10]	4.70[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[6]	4.313[3]	5.313[26]	5.594[10]	3.75[23]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[12]	7.20[4]	5.683[21]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[15]	5.433[21]	7.353	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.633[15]	.....	.....	.....
Tacoma	4.35[5]	4.45[5]	4.75[5]	6.50[5]	4.65[5]	4.25[5]	5.45[5]	5.95[15]	7.60[15]	5.883[21]	.....	.....	8.00[23]
Seattle	4.35[5]	4.45[5]	4.75[5]	6.50[5]	4.65[5]	4.25[5]	5.45[5]	5.95[15]	7.05[15]	5.883[21]	.....	.....	8.00[23]

*Basing point cities with quotations representing mill prices, plus warehouse spread.
NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.95
Mesabi nonbessemer	4.55
High phosphorus	4.55
Mesabi bessemer	4.70
Old range nonbessemer	4.80

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	18.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S $ paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50

Domestic (seller's nearest rail)

48% 3:1	52.80

less $7 freight allowance

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per GT	Electric furnace Bars per 100 lb.	Electric furnace Billets per GT
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c. per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximum fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, and Oct. 22, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.75	$26.25	$27.75	$27.25
Newark, N. J., del.	28.28	27.78	29.28	28.78
Brooklyn, N. Y., del.	29.25	.....	.....	29.75
Birdsboro, Pa., base	26.75	26.25	27.75	27.25
Birmingham, base	22.13	20.75	26.75	.....
Baltimore, del.	27.36	.....	.....	.....
Boston, del.	26.89	.....	.....	.....
Chicago, del.	25.97	.....	.....	.....
Cincinnati, del.	25.81	24.48	.....	.....
Cleveland, del.	25.87	24.99	.....	.....
Newark, N. J.	27.90	.....	.....	.....
Philadelphia, del.	27.21	26.71	.....	.....
St. Louis, del.	25.87	24.99	.....	.....
Buffalo, base	25.75	24.75	26.75	26.25
Boston, del.	27.25	26.75	28.25	27.75
Rochester, del.	27.28	.....	28.28	27.78
Syracuse, del.	27.83	.....	28.83	28.33
Chicago, base	25.75	25.25	26.25	25.75
Milwaukee, del.	26.85	26.35	27.35	26.85
Muskegon, Mich., del.	28.94	.....	.....	28.94
Cleveland, base	25.75	25.25	26.25	25.75
Akron, Canton, del.	27.14	26.64	27.64	27.14
Detroit, base	25.75	25.25	26.25	25.75
Saginaw, Mich., del.	28.06	27.56	28.56	28.06
Duluth, base	26.25	25.75	26.75	26.25
St. Paul, del.	28.38	27.88	28.88	28.38
Erie, Pa., base	25.75	25.25	26.75	26.25
Everett, Mass., base	26.75	26.25	27.75	27.25
Boston, del.	27.25	26.75	28.25	27.75
Granite City, Ill., base	25.75	25.25	26.25	25.75
St. Louis, del.	26.25	25.75	.....	26.25
Hamilton, O., base	25.75	25.25	.....	25.75
Cincinnati, del.	26.19	26.36	.....	26.86
Neville Island, Pa., base	25.75	25.25	26.25	25.75
§Pittsburgh, del. No. & So. sides	26.44	25.94	26.94	26.44
Provo, Utah, base	23.75	23.25	.....	.....
Sharpsville, Pa., base	25.75	25.25	26.25	25.75
Sparrows Point, base	26.75	26.25	.....	.....
Baltimore, del.	27.74	.....	.....	.....
Steelton, Pa., base	.....	26.25	.....	27.25
Swedeland, Pa., base	26.75	26.25	27.75	27.25
Philadelphia, del.	27.59	27.09	.....	28.09
Toledo, O., base	25.75	25.25	26.25	25.75
Youngstown, O., base	25.75	25.25	26.25	25.75
Mansfield, O., del.	27.69	27.19	28.19	27.69

Base grade. silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. § For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenbridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)			$31.25
6.51-7.00	$32.25	9.01- 9.50	37.25
7.01-7.50	33.25	9.51-10.00	38.25
7.51-8.00	34.25	10.01-10.50	39.25
8.01-8.50	35.25	10.51-11.00	40.25
8.51-9.00	36.25	11.01-11.50	41.25

F.o.b. Jackson county, O., per gross ton. Buffalo base $1.25 higher, whichever is most favorable to buyer Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50 Jackson Co.; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.005 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $25.25
Valley base 25.25

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $31.25 base; $32.49, del. Philadelphia. Intermediate phos., Central Furnace, Cleveland, $28.25.

Switching Charges: Basing Point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	50.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases 63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	32.90
Wire Cut	30.80

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	28.00

Basic Brick

net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded Magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.00 war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, $135 f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn.; where Tennessee Products Co. is producer; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is producer; $140 f.o.b. cars, Pittsburgh, where Carnegie-Illinois Steel Corp. is producer; add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk. c.l., 79.50c, 2000 lb. to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western: spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide, approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; east: Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61 central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c, and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all f.o.b. Bridgeville, Pa., usual freight allowance.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c; 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96% min. manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 30c, 2000 lb. to c.l., 32c, central, 30.25c, and 33c; western 30.55c and 35.05c.

Ferrotungsten: Spot, 10,000 lb. or more, per lb. contained tungsten, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Tungsten Metal Powder: Spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6.8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 156 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.31
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O:

(Delivered consumer's plant)

Machine Shop Turnings	15.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dir. Bundles	18.75
Baled Mach. Shop Turn	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.50
Shoveling Turnings	12.50
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25
(Cast grades f.o.b. shipping point)	
Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	9.50-10.00
Shoveling Turnings	11.50-12.00
Cast Iron Borings	11.00-11.50
Mixed Borings, Turnings	10.50-11.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	7.00
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut, Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.00
Tin Can Bundles	14.50
No. 2 Steel Wheels	15.50
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.50
Uncut Frogs, Switches	15.50
Scrap Rails	15.50
Locomotive Tires	15.50

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12,12⅛c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more. 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.45c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.00c to 8.25c, Grade 4 (85-90%) 7.75c; any other ingot containing over 1% iron, except PM 754 and hardeners, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots, Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.
Mercury: Open market, spot, New York, $108-$110 per 76-lb. flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.
Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.785
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz Metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Price f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ¼-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 190

Pressure for sheet delivery is losing some force as consumer plants close because of labor interruptions. Orders continue to be placed but usually are simply filed for later acceptance. Consumer inventory in general is much below permitted level. Some scattered sheet capacity still is operating, affording relief to some consumers.

Pittsburgh — Except for the Butler, Pa., plant of American Rolling Mill Co., sheet output in this district is completely shut down. New business still is being placed, but in sharply reduced volume. No delivery commitments are made on new orders for some revision in present schedules may be necessary to meet essential needs when operations are resumed. Despite voluntary rationing of sheet and strip output, based on prewar customer relationships, order backlogs extend well into third quarter, with galvanized items booked through 1946. Extremely tight supply in sheets and strip, reported for some time, is reflected in fact that of all steel products, consumers' inventories of these items are well below that permitted under government regulations.

Unfavorable sheet bar outlook for nonintegrated producers holds promise of clarifying soon, according to CPA officials, who state that through the combined efforts of the companies concerned and certain government agencies the problem has been overcome for the immediate future, and longer range plans are being explored. Prior to the steel strike nonintegrated producers obtained some relief through shipment by integrated interests of sufficient tonnage of sheet bars to permit nonintegrated plants to work off their commitments.

Boston — Extensive rescheduling confronts sheet producers when production is resumed, all grades and finishes included. Unpolished stainless sheets were becoming rapidly extended before the strike and may be allocated by some. The electrical strike was affecting silicon grades, on which mills are sold into third quarter and some of this tonnage will be reassigned. Supply of galvanized is low. Hot and cold-rolled carbon sheets, in lighter gages especially, will be subject to schedule revisions. Two district producers of narrow cold strip are still operating and taking orders without delivery promises.

St. Louis — End of the first week of the steel strike found demand for sheets and strip on the increase and mills attempting to squeeze hardship cases into rolling schedules which already were booked through the year. Delivery dates are being pushed back steadily and order backlogs are getting bigger. Mills predict an even greater scramble for sheets when the strike is over, even though there is evidence of some duplication in orders.

Cincinnati — The Middletown and Hamilton plants of American Rolling Mill Co. are producing normally but mills at Ashland, Ky., are strike-bound. The company has not yet announced method of revising schedules and delivery positions in adjustment to curtailed production. The company is under pressure for tonnage, and buying is sustained without interruption.

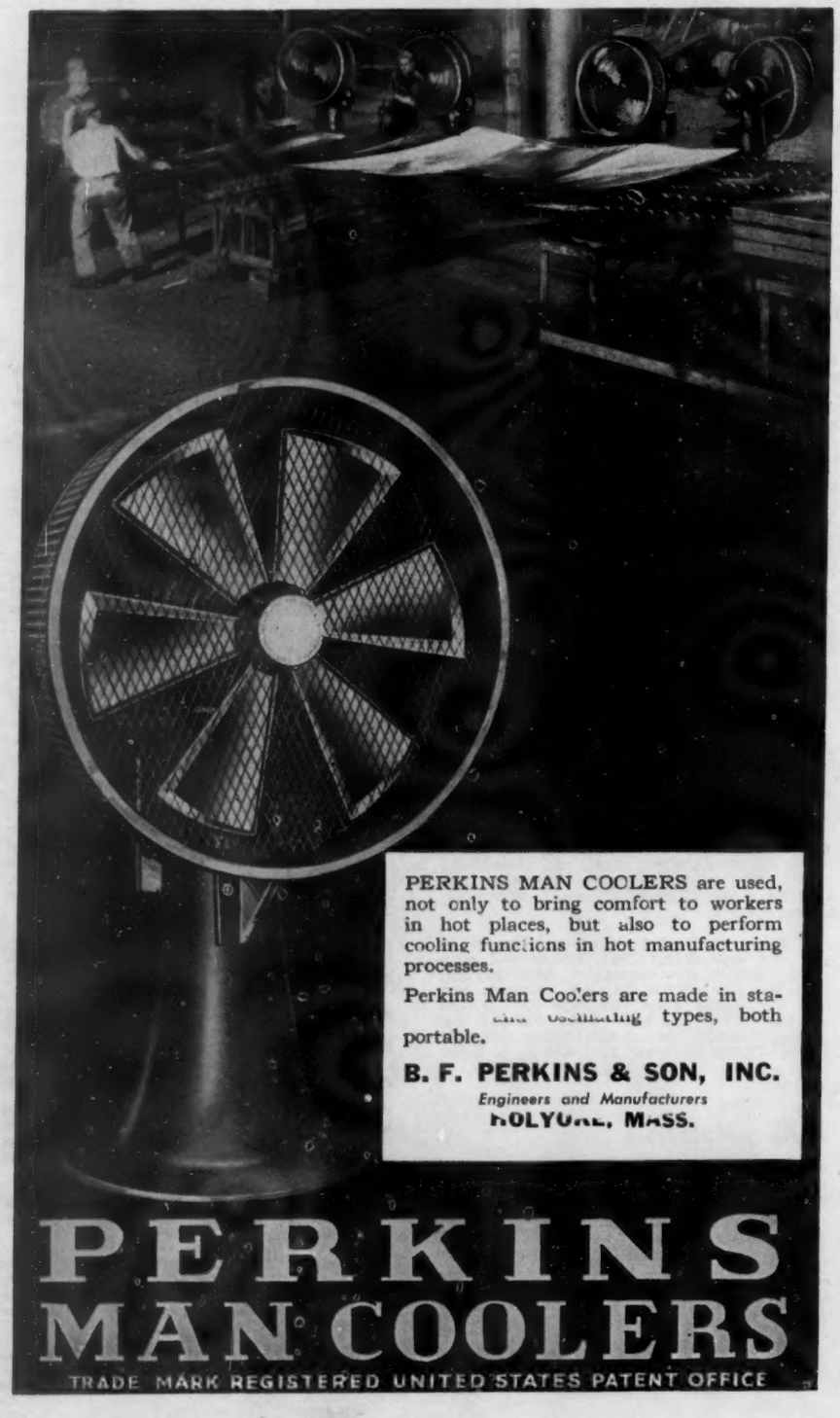
Birmingham—What balance had been built up on demand-delivery schedules in sheets, one of the most sought items, has been upset by current developments. Birmingham mills, which already have instituted allocations of their own, will be forced to tighten that schedule.

Cleveland—Steel sheet producers report a gradual decline in inquiry as the strike progresses. This is attributed to the fact that many of their customers' plants are closed by labor trouble; operations of others are being curtailed or halted due to lack of raw materials; and consumers realize that producers cannot enter orders on mill schedules or make delivery promises. The orders are being held, however, for processing as soon as the strike is terminated. Although rolling and shipping schedules will be resumed where they left off at the beginning of the strike, several new factors will require certain adjustments. For instance, some provision will be made to replenish warehouse stocks which have shrunk further than had been anticipated when schedules were originally set up.

Steel Bars . . .

Bar Prices, Page 190

Consumers continue to place orders for steel bars for delivery at mill convenience but aggregate of such buying is not large. Fabricators are becoming less numerous as supply dwindles. Prior to the steel strike deliveries were quoted for third and fourth quarter generally.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Strike delay will push these dates further into the future.

Pittsburgh — Orders continue to be placed for delivery at mill convenience. Most auto partsmakers have inventories representing slightly over 30 days' output, but this situation would soon be depleted should settlement of General Motors strike occur well before the steel wage-price dispute is terminated. All bar production facilities are idle in this district. The Weirton Steel Co.'s plant at Weirton, W. Va., is lone unit operating in the Wheeling district. Prior to the strike most mills were booked well into third quarter on small carbon bars, with cold-rolled items and alloys available in second quarter. The Navy's Redistribution and Disposal Office here will take bids Feb. 5 on over 35,000 pounds of stainless steel bars located at the Westinghouse Electric Corp.'s East Pittsburgh, Pa., plant. Same office takes bids Feb. 11 on 125,820 pounds of free machining cold-drawn rounds located at Charles N. Hough Mfg. Co. plants, Franklin, Pa.

Boston — In small sizes, two-inch and under, fabricators have limited stocks of carbon bars, a few over 30 days. Stainless stocks, except for sheets, are in fair condition with distributors, while supply of other alloys is relatively better than in carbon. Restricted operations in several industries are affecting parts suppliers and, in turn, bars. In a few cases operations have been reduced to conserve bar stocks.

Chicago — Only district barmaker whose production is not affected by the steel strike is Wisconsin Steel Division of International Harvester Co. and as a result it has been under pressure from consumers cut off from regular sources of supply. Fact that major plants of International Harvester are closed by strikes, and further fact that strike-bound plants of General Motors have warehoused the allowable limit of steel, has created a few openings and permitted the company to divert moderate tonnages of bars to a few consumers in distress. Effect of the changed consumption picture has been to move scheduled deliveries up a month from March to February.

New York—Consumption of bars continues to taper as the steel strike runs on. Some consumers are now down completely, while others, whose stocks are running low, are reducing operations. Each day from now on until the end of the steel strike is expected to see further suspensions.

In general, deliveries will be set back in accordance with the time involved in the steel strike, plus probably several days required to get mills going once the end of the strike has been declared. At the time the strike was called, two weeks ago, deliveries on hot carbon bars were being quoted generally for third and fourth quarters, depending largely upon the sizes involved. In other words, large diameter bars were available early in third quarter and, in fact, some were to be had in late June, while small sizes in most instances could not be had before fourth quarter. Certain smaller sizes were being offered by some sellers for no earlier than late November and December.

Hot alloy bars were being quoted at the time the strike began for March shipment.

Steel Plates . . .

Plate Prices, Page 191

Plate consumers still seek to place further orders, but except in a few instances are unable to do so, though some business, especially in light gages is being booked. Mills in general were booked four and a half months to six or seven months at the beginning of the strike. Tonnage now being booked is simply space reservation, with specifications to be filed later. Plate shipments will be delayed a week or more after resumption of production while furnaces are repaired and raw materials are assembled.

New York — It will require from a few days to at least a week for plate producers to get moving on shipments after the steel strike is over, in the opinion of trade leaders. Some sellers are confident that it will take them even longer before shipments will reach normal volume. Open hearths will be in need of repair at some plants and much in the way of raw materials will have to be moved in before operations can get under way. At some plants at least, shipments of raw materials already on cars at the time the steel strike was called have been moved in, but the quantities involved have not been heavy and at certain plants incoming shipments have been practically shut off since the first day of the strike.

Generally speaking plate mills were booked ahead four and a half to six

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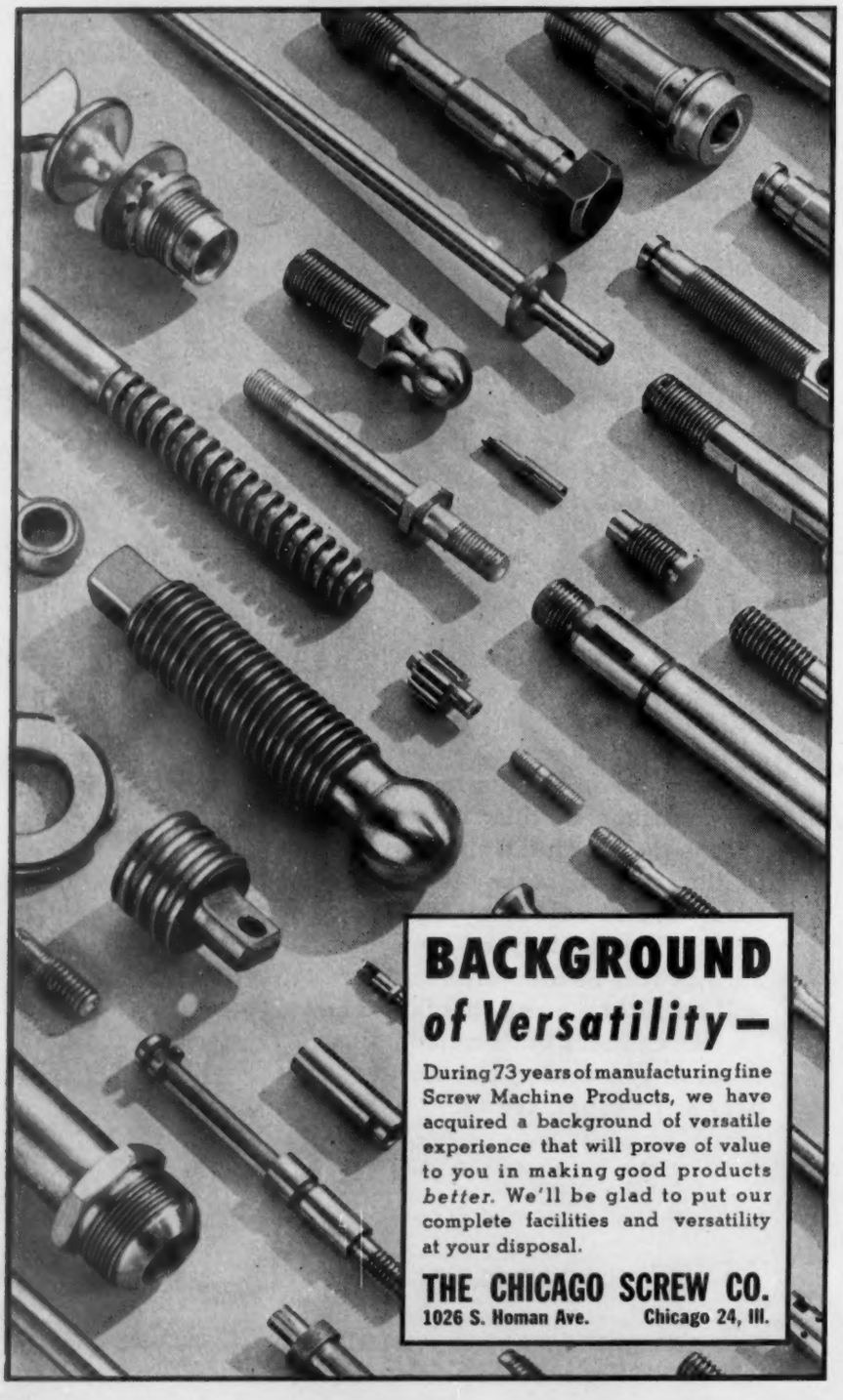
months at the time the steel strike was called, and in at least one instance, seven months.

Boston — For the duration at least plate mills have nothing to sell but future rolling space. On this basis fair tonnage is booked, subject to definite specifications later. Plate shops with few exceptions are operating; lack of heads would be felt first by some. Large tank inquiry is slightly more active. Lever Bros., Cambridge, Mass., has a large expansion program, Stone & Webster, engineer-contractors; latter has placed 300 tons for a Baltimore project. George Lawley & Son Corp. shipyard, Neponset, Mass., will liquidate. This oldtime yacht and small shipbuilder converted to larger warships in two wars. At peak the yard employed 4800, building 161 LCI's, 47 LCS's, 12 light tankers and hundreds of smaller craft. Maritime Commission closes March 18 on construction of three fast 650-foot passenger liners for American Export Lines for the Mediterranean trade. Ships are to be P3-S2-DL1 type with 13,600 tons cargo space, powered by steam turbines, 37,000 hp, twin screws, 22 knots.

Birmingham—The steel strike already has aggravated the tight situation in plates as it has every other steel product. Orders continue in volume even in the face of no production and the probability that several weeks has been added to delivery time, even under the most favorable developments.

Seattle — More interest in plates is evident, though some jobs are being held back until materials are available. Paul Jarvis Inc., Seattle, has a $164,016 contract for an electric welded penstock for the Seattle municipal light plant, requiring 500 tons of 3/8 to ½-inch plates.

Philadelphia — Although most plate mills are quoting tentatively early third quarter delivery, two eastern mills have nothing to offer before August and another is virtually booked for entire third quarter. Inquiry is down appreciably from prestrike volume but is fairly good, especially as it becomes known most plate sellers are willing to schedule orders, in contrast to policy of producers of more scarce products, such as sheets and strip. Plate mills are conservative in acceptance of light gages, in most demand, unless accompanied by a certain percentage of heavier material.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Tubular Goods . . .

Tubular Goods Prices, Page 191

Seattle—Cast iron pipe is active but is beginning to feel effects of curtailed production. Potential demand in this area is large and if producers can deliver agencies expect a heavy year. H. C. Purcell, Seattle, has been awarded 750 tons of 2 to 12-inch water pipe for the Powell Valley project at Portland, Oreg., and also is low for an unstated tonnage of 4 to 8-inch for the Snohomish County Public Utility District in Washington. Bids are in on 750 tons for the Metzger water district at Portland. Capitol highway district, Portland, opened bids Jan. 30 on 500 tons or more. I. S. Fetterman, Spokane, Wash., purchasing agent, will open bids Feb. 7 on about 450 tons of 6-inch bell and spigot pipe.

Wire . . .

Wire Prices, Page 191

Pittsburgh — Many wire consumers will have depleted stocks if the steel strike lasts over 3 to 4 weeks. The present low inventory among fabricators would be further accentuated should the General Motors strike terminate soon. Wire production facilities here are completely shut down, as is generally the case throughout the country, with the exception of three interests in the East. Jobbers' stocks of merchant wire items have been well below normal for some time despite lifting, around the middle of last year, of war production restrictions on nails, barbed wire and other products. This unbalanced and relatively low inventory position of most distributors will be further accentuated as result of the steel strike. Price relief developing out of the current steel wage-price dispute may result in a greater emphasis on output of wire rods, manufacturers' wire and merchant products. In past output of many items in these categories were restricted, due to the losses sustained.

Boston — Although production of drawn wire has been drastically reduced it is in excess of rod output and shortage of semifinished promises to be a major factor in early poststrike period. Whether the price advance will be enough to attract tonnage from outside the district is conjectural.

Cleveland—There has been no letup in demand for wire since the beginning of the steel strike. Orders are being accepted for manufacturers' wire prod-

ucts but no promises are being made as to delivery. Mill drawing and shipping schedules will undergo thorough revision when operations are resumed because the time lag between termination of the strike and resumption of rolling schedules will vary from a few days to several weeks at various mills and raw materials will not flow into wire mills as originally scheduled. In the case of merchant products, producers will continue to allocate output on the same basis as prior to the strike with each customer receiving a percentage of available supplies in proportion to that received in the base period. Jobber stocks are practically depleted now, reflecting the low level prevailing early last month. About half of the products shipped from mills had been going directly into consumer channels, bypassing warehouses.

Tin Plate . . .

Tin Plate Prices, Page 191

Pittsburgh — Except for continued production at Weirton Steel Co.'s Weirton, W. Va., and Steubenville, O., plants, all tin plate facilities are shut down. This situation presents a threat to the nation's food supply this year should the strike continue long. Under present inventory restrictions container manufacturers have not been able to accumulate more than a 60-day supply, and it is reported that some plants have considerably less. Loss of tin plate output during the strike will be increased by necessary delay in returning to normal operations and curtailment in output in preparation for the strike also must be considered. Preference may have to be given to tin plate output to meet the 1946 food pack peak requirements expected in July. Some thought is being given to reducing scheduled export shipments of 216,000 tons for first half.

Box car shortage prevented last minute efforts of consumers to build up inventories. The present relatively low inventory position of can manufacturers is offset somewhat by the fact that 11 of the 20 plants of American Can Co. are shut down by the steel strike or other labor difficulties, and 8 out of the 20 Continental Can Co.'s plants are similarly closed. There has been a general sag in orders since start of the strike and this trend is becoming more pronounced as the strike progresses. Prior to the strike producers' order backlogs generally were extended well into second quarter. Producers are freezing all tin mill products commitments at the point when the strike halted rolling and finishing schedules. Carnegie-Illinois Steel Corp. officials state all new orders are being held up by district offices. All new tonnage submitted for later scheduling must await a new post-strike timetable for prior commitments.

Decision of Bethlehem Steel Co. to make Sparrows Point, Md., a base on such grades of tin mill products as are produced by its plants there, effective on shipments on and after Jan. 1, follows closely on the heels of Tennessee Coal, Iron & Railroad Co. establishing Birmingham a base on tin mill products produced by the company at that point. Newly established base prices at Sparrows Point and Birmingham are similar to those prevailing at Granite City, or 10 cents above those applying at Pittsburgh, Chicago and Gary. District sellers here will meet competition resulting from Bethlehem Steel Corp.'s new base at Sparrows Point, which means, in addition, a revision in billings on all tonnage shipped since Dec. 31. In shipping to Baltimore, for example, producers here formerly charged the Pittsburgh base price of $5 per 100-pound base box on hot-dipped tin plate, plus 30 cents freight rate. There is a moderate service or switching charge from Sparrows Point to Baltimore said to be about 4 cents per 100 pounds. This would mean that sellers in this district would receive $4.74 net per base box on shipments into Baltimore, in contrast with the former price of $5.

Structural Shapes . . .

Structural Shape Prices, Page 191

New York — Some contractors are taking advantage of the present easing of pressure on estimating departments resulting from the steel strike to bring out new projects. Since the steel strike began there has not only been a fair amount of inquiry, but some actual placing of tonnage, the latest including 735 tons for Conde Nast Publications Inc., Greenwich, Conn., placed with Bethlehem Steel Co., Bethlehem, Pa. Meanwhile, it is planned to bring up a section of the Battery Place-Brooklyn tunnel, involving more than 4000 tons of shapes, for re-bidding shortly.

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Local offices of fabricating shops which have been forced down because of strikes, are taking the opportunity of getting caught up on drafting work. Some have been behind as much as two months on details because of shortage of estimators and draftsmen.

Boston — By shopping for fill-in sizes, most small fabricated structural steel projects will be completed near schedule, but some heavier jobs in shops affected by work stoppages will be delayed. Employment of escalator clauses in pending contracts is more apparent with material and labor costs prospectively higher. Inquiry is heavier, including close to 12,000 tons of bearing and sheet piling. Industrial expansions include 400 tons for a building for Norton-Pike Co., Littleton, N. H., to American Bridge Co.

Philadelphia — Shape mills are now well into third quarter, though accepting new tonnage sparingly. In spite of the fact the strike is holding up much demand more business is offered than is being entered, carbuilders and jobbers pressing for tonnage, as well as structural contractors. Cancellation is received of 2700 tons for an office building at Wilmington, Del., for du Pont interests. At least three structural fabricating shops continue in operation in this district, with enough material on hand for two weeks or so.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 191

Pittsburgh — Current reinforcing bar production tie-up is expected to impede expansion programs contemplated this spring. At least one interest is not preparing price estimates on inquiries as office forces are not working. Some work also is reportedly held up because a few fabricating plants are shut down by the steel wage dispute. New inquiries include three projects in this area for U. S. engineers, involving 200 to 400 tons. However, volume of new work up for bids has declined substantially since the start of the steel strike. Just before the strike producers' order backlogs averaged about 5 to 6 months for domestic tonnage and in some instances sellers were sold 18 months ahead on export business. Sellers' future delivery program is not expected to be altered much after the termination of the strike, for most producers anticipate little adjustment in production schedules in relation to overall mill bar output when production is resumed.

Seattle — Reinforcing inquiries are increasing and several building projects requiring considerable tonnage have been awarded. When the material will be available is doubtful. Both Washington and Oregon have awarded several road contracts requiring reinforcing steel. Equitable Savings & Loan Association has let contract to Ross B. Hammond, Portland, Oreg., for a 12-story office building at Portland. Several packing and refrigerating plants contracted in Washington and Oregon call for considerable reinforcing steel.

Rails, Cars . . .

Track Material Prices, Page 191

New York—The Polish government plans to issue specifications within a few days for 15,000 to 20,000 gondola cars of 20 to 40 tons capacity. Cleveland Transit System Cleveland has let 50 trolley coaches to St. Louis Car Co. St. Louis.

Birmingham — Bessemer Ala. plant of Pullman-Standard Car Mfg. Co. has been awarded 4500 of the 10,000 twenty-ton box cars recently placed with Pullman by the French government. Production is scheduled to start in June and be completed in November, contingent on availability of materials.

Pig Iron . . .

Pig Iron Prices, Page 193

Supplies are tight as few blast furnaces continue operation but foundries continue operations on reserves and such tonnage as can be shipped. In some cases foundry melt has been increased, scrap supplementing pig iron. Coke shortage may enter as a factor limiting melt as the steel strike progresses.

New York — While little pig iron is moving, only one blast furnace being in operation along the eastern seaboard, actual consumption in this district has improved since the beginning of the steel strike. This is ascribed principally to the fact that seven gray iron foundries in Brooklyn, which had been down since early in January, as a result of labor dispute with the American Federation of Labor, resumed operations Jan. 28.

Meanwhile, there has been little increase in the number of CIO foundries which closed down at the time the steel strike was called. In fact, in the immediate Newark, N. J., area, where eight of these foundries closed down, one has actually resumed operations as a result of adjustment in wages. Most foundries which had been operating steadily during the steel strike continue to maintain production fairly well, although there has been some tapering in spots. Should the steel strike continue much longer the general melt will begin to subside sharply. Most foundries have bought about 30 days supply of pig iron on hand, the limit under CPA regulations, and can spread this to some degree by greater use of scrap. However, a handicap in this respect may prove to be the shortage of coke and certain other raw materials.

Birmingham — The pig iron situation here is tighter. Regular users are being taken care of satisfactorily and producers urge that requirements be anticipated and contracted as far ahead as possible.

Philadelphia — With only one district blast furnace operating pressure for foundry iron is heavy, accentuated by the fact that most foundries have been able to operate thus far. Under these conditions demand for ferrosilicon has increased sharply. Unless the steel strike ends soon most foundries now operating will be forced to close, a number meanwhile curtailing production. Most foundries had no more than 30 days supply of iron and a number relying on truck shipments had less.

Chicago — Many foundries in this district face curtailment in melt or complete shutdown within a week or two from exhaustion of iron and coke supply. The situation is spotty, however, as the steel strike has not forced all blast furnaces down. Output of the two South Chicago furnaces of Interlake Iron Corp. is unaffected, as is that of three stacks of Wisconsin Steel Division of International Harvester Co. Only a part of the latter's

production is sold, but strikes at several Harvester foundries have permitted some of this iron to be diverted to other foundry accounts. Although by union consent Carnegie-Illinois Steel Corp. continues to operate two blast furnaces at Gary and Inland Steel Co. two at Indiana Harbor, iron can not be shipped from the strike-bound plants. A similar situation exists on coke.

Cleveland—Inquiry for pig iron continues heavy, although overall demand is somewhat lighter, due to the fact some foundries are strike bound. Sellers still able to ship have received a tremendous volume of inquiry from consumers whose usual source of supply has dried up, but they have been unable to take on new customers. In order to conserve supplies, some foundries have reduced their work week. By this and other conservation measures, most of the foundries new expect to be able to maintain present melting schedules through February.

Boston—Pig iron melt is down 60 to 65 per cent in New England, including two of the largest consumers of basic. Volume of incoming iron has dropped further and has all but stopped. Foundries that are operating are drawing from inventory. Most are under 30 days while others are even worse off and are beginning to curtail. Regardless of the time element in length of strike numerous shops will be pinched for iron. Blast furnaces have no inventory and demand at strike end will be so heavy that many consumers are bound to be pinched.

Cincinnati — Most foundries are receiving pig iron shipments in volume to sustain the melt close to previous levels, but a few find sources of supply clogged by strikes. It is doubtful if emergency supplies can be found, in a tight market where old customers are taking all iron. Few melters had full 30-day inventory, most being down to two weeks.

Scrap . . .

Scrap Prices, Page 194

With steelmaking practically stopped by strike, movement of scrap is interfered with and various plans are in use to continue shipments to afford a supply for later use. Melters believe a shortage will exist after the strike and seek to get possession of as much as possible, storing it in whatever way can be found. Some embargoes have been set by railroads to prevent cars being held under demurrage. Scarcity exists in most grades, with production scrap dwindling as more plants close from lack of steel supply.

Pittsburgh — Leading consumer continues to stock heavy melting steel scrap at Curry Hollow near Irvin, Pa. Most other interests, however, are out of the market for they haven't adequate storage facilities near plants or can't obtain manpower to unload cars. Some consumers have offered to pay demurrage on scrap cars that they have been unable to unload but railroads have embargoed shipments in these instances to prevent temporary loss of rolling stock. Movement of scrap is at a low ebb, with most consumers forced to hold up shipments while shipments to interests still accepting deliveries are restricted.

Dealers' yards in some instances are used by large consumers to store scrap, but costly handling charges make this practice prohibitive in most instances.

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The tight supply in cast scrap has eased somewhat the past 10 days as a number of foundries are closed over the steel wage dispute. Flow of scrap into the Wheeling area is fairly heavy with plants there accepting most tonnage offered. Weirton Steel Co.'s plants are not affected by the strike, while other plants there reportedly have an agreement with the union to unload scrap at mills.

Boston—At full ceiling prices, including premiums, demand for steel and cast iron scrap is strong and, while shipments have been suspended in many instances, a substantial number still take material. Supply is tight, production of industrial scrap is down and offerings of unprepared material are limited. Efforts to husband pig iron supply by increasing scrap proportion are limited by lack of the latter in some cases. Cast grades continue among the tightest.

Philadelphia — Scrap movement continues to shrink, with broker shipments down to about 25 per cent of prestrike volume. Demand for heavy melting steel is down because of the strike, with only one district mill taking limited volume. Some tonnage is moving to West Virginia. Production of steel scrap is also down because of suspensions and reduced operations at many metalworking shops. Some termination scrap and government surplus is being offered, but in small volume, promptly taken by dealers at high prices. Cast scrap is scarcest item with demand heavy by foundries in shortage of pig iron.

Chicago — Scrap activity remains high despite the steel strike which has forced down all but one producer in the district. Incoming material is being unloaded on docks or at outside storage points, this being more economical than holding in cars. A noticeable decline is taking place in industrial or production scrap, because many consumers of steel either are down with strikes or are curtailing operations from lack of material. Mills continue to place orders for scrap, and only in a few instances are shipments being held up. The latter involves principally certain alloy scrap and blast furnace material.

Buffalo — Leading mill consumers of scrap have intensified efforts to place scrap orders in spite of suspension of ingot production. Dealers are acceding to consumer requests to hold scrap for later shipment as far as possible. Flow of scrap is at a minimum and dealers concentrate on processing yard stocks, which are dwindling rapidly. Embargo has been placed on shipments to the Bethlehem Lackawanna mill. Republic and Wickwire Spencer have held up shipments as yards are filled with loaded cars.

Cincinnati — Iron and steel scrap is moving to mills and foundries to the limit of supplies, despite some suspensions in and near this district. Demand for cast scrap is pronounced. A definite downward trend in volume of scrap coming out not only is serving to avoid a surplus but is creating opinion that a shortage of good scrap might have developed had the strike not been called. So far scrap has moved to consumers so steadily that practically no tonnage has backed up in dealers' yards.

Birmingham — The scrap market remains tight. One cause is the fact that yard help is short. Another is that the men will not work outside in the kind of weather prevalent in the south since before Thanksgiving. Railroads still have their embargo against steel mills which, although they are willing to pay demurrage, have not overcome objection on the part of the railroads against tying up equipment. Ceiling prices hold.

St. Louis — Deliveries of scrap on mill orders are down 50 per cent. Dealers, foreseeing a post-strike rush, are searching remote points for metal which can be bought and held at the source. Most mills are prevented by unions from taking deliveries but some are stockpiling it in dealers' yards. Overall reserves average three weeks. Steel and cast grades remain in heaviest demand. All prices are at ceilings.

Warehouse . . .

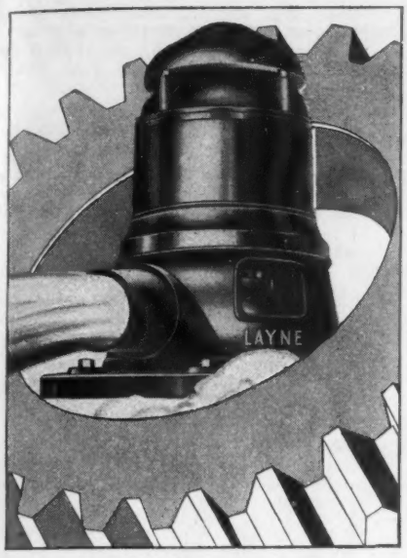
Warehouse Prices, Page 192

Pittsburgh—The few steel distributors here not shut down because of the wage dispute report unprecedented volume of new customers seeking to bolster their dwindling inventories. In some instances inquiries have been received from as far as Texas. Sheets, small size bars and light structurals are in heaviest demand. The supply in sheets is particularly acute, notably in galvanized items, 24-gage and lighter. Alloy bars and pipe are in somewhat better inventory position and to a less extent merchant wire items. Most new inquiries are being rejected, as warehouse interests are rationing available stocks to regular customers. Those distributors operating expect to be out of steel within a few weeks should the strike continue, except for relatively small tonnages held for emergency repairs and maintenance requirements for transportation equipment, hospitals, public utilities, etc.

New York—Warehouse distributors of steel are tightening earlier rigid rationing to stretch out unbalanced inventories, notably in carbon grades, as far as possible. Because of an expected lag of two to three weeks in receipts from mills after production is resumed some form of sales allocation will be continued after the strike. Inquiry is heavy, but has subsided slightly as consumers begin to realize limitations confronting distributors. However, some prospective buyers, knowing inquiries will be screened to a minimum, are multiplying actual requirements with the hope of getting more steel. Sheet inventories are small; some sellers have no galvanized and few black in lighter gages. Leading distributor of nails is limiting orders to 1500 pounds.

Boston — Most warehouses could sell themselves out of business on some products within a few days, without rationing although inventories in this section are somewhat better than the average, sheets and shapes possibly excepted. Taking the longer range view, distributors are concerned as to delays in replacements after mills start rolling and how any price increases will be applied. They expect to pay more for steel, but question ability to absorb any substantial part of the increase. Most steel now going to consumers is from warehouse and in the case of alloys, some rather topheavy inventories are being reduced.

Philadelphia — Notwithstanding drop in mill shipments late in January because of the steel strike, Philadelphia jobbers report January business about equal to December. Meanwhile jobbers are dis-



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VERTICAL TURBINE PUMPS

turbed over reports that OPA does not plan to permit them to pass on to customers such prices as may be granted to mills. This, it is pointed out, is in line with OPA policy, but distributors declare there is a limit to which this policy can be extended and permit a reasonable profit.

Chicago—Warehouses report demand for steel has fallen considerably below the level immeditately prior to the steel strike, when consumers were seeking to acquire better inventories for an emergency. This drop comes partly from the fact that plants of some customers now are closed by strikes. Warehouses had sought to build up stocks prior to the stoppage of shipments from mills and partially accomplished this aim. Principal shortage of material is in sheets, particularly lighter gages.

Cleveland—Stocks held by warehouses are being conserved by close control over shipments. Orders are being accepted only for immediate needs and, where necessary to assure equitable distribution among regular customers, are being reduced from the amounts requested. Most warehouses not closed by strikes entered the present tight supply period with the largest stocks since the war ended, receipts having increased sharply in some instances during the first two weeks of the year. Light-gage material is particularly scarce. Some warehouses are from a week to ten day behind shipping schedules, reflecting in part the upsurge in demand. No estimate as to how long stocks will hold out is possible since demand will decline in direct proportion to the rate of shutdowns of industrial plants due to the steel strike.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

700 tons, resin plant boiler house, Toledo, for Libbey-Owens-Ford Glass Co., to Whitehead & Kales Co., Detroit; Stone & Webster Engineering Co., Boston, contractor; bids Jan. 7.

500 tons, extension to factory building, Kenosha, Wis., for American Brass Co., Austin Co., Chicago, contractor, will do own fabricating; bids Jan. 11.

464 tons, metallurgical building, Chicago, for Illinois Institute of Technology, to American Bridge Co., Pittsburgh; bids Jan. 4.

450 tons, expansion, Rockford, Ill., for American Cabinet Hardware Corp., to Mississippi Valley Structural Steel Co., Decatur, Ill.; Linden & Sons, Rockford, Ill., contractor.

440 tons, beam spans, Conroe and Leonidas, Tex., for State Highway Commission, to Pennsylvania Iron Works, Beaumont, Tex.

400 tons, beam span, Temple, Tex., for State Highway Commission, to Virginia Bridge Co., Roanoke, Va.

330 tons, addition for Campbell Soup Co., Camden, N. J., to American Bridge Co., Pittsburgh, through Austin Co., New York.

325 tons, process building, San Jose, Calif., for International Mining & Chemical Corp., to American Bridge Co., Pittsburgh; Stone & Webster Engineering Co., Boston, contractor.

320 tons, power house, Ludlow Mfg. Co., Ludlow, Mass., to Haarmann Steel Co., Holyoke, Mass.

300 tons, new washer and filtration plant for phosphate mining, Bartow, Fla., for Swift & Co., to Tampa Shipbuilding Co. Inc., Tampa, Fla.

200 tons, warehouse and office building, Chicago for John A. Roebling's Sons Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.

190 tons, warehouse in Pittsburgh district, to western Pennsylvania fabricator, through

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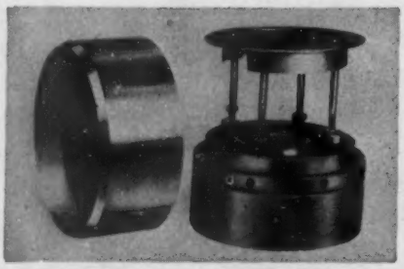

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120 tons, new plant, Melrose Park, Ill., for Insul-Mastic Laboratories Inc., to Mississippi Valley Structural Steel Co., Decatur, Ill.

103 tons, addition, Mount Morris, Ill., for Kable Bros. Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.; Sjostrom & Son, Rockford, Ill., contractor.

100 tons. two-story addition, B. B. Chemical Co., Cambridge, Mass., to Groisser & Shlager, Somerville, Mass.; Aberthaw Company, Boston, general contractor; reinforcing bars to Bethlehem Steel Co., Bethlehem, Pa.

Unstated tonnage, additions, including power plant, Union Twist Drill Co., Athol, Mass., to Stafford Iron Works, Worcester, Mass.; E. J. Cross Co., Worcester, general contractor; reinforcing bars to George F. Blake Inc., Worcester.

STRUCTURAL STEEL PENDING

4000 tons, Governors Island shaft of Battery-Brooklyn tunnel; rebid by contractors Feb. 14.

1000 tons. publishing building, Peoria, Ill., for Peoria Newspapers Inc.; bids Jan. 22.

885 tons, Willow road grade separation, Northfield township, Ill., for Cook county; bids Jan. 21, none submitted.

875 tons, five highway overpasses, route 25, sections 32A and 16C, Newark and Elizabeth, N. J.; bids Feb. 18 to Spencer Miller Jr., highway commissioner, Trenton.

800 tons. paper mill, Los Angeles, for United States Gypsum Co.

738 tons, tunnel supports, relocation 16 miles, Conemaugh division, Pennsylvania railroad, Blairsville-Avonmore, Pa.; bids to U. S. engineer office, Pittsburgh.

720 tons, structural wall armor, reconstruction lock 2, Monongahela river, Braddock, Pa.; bids to U. S. engineer, Pittsburgh; also 565 tons cast steel wall armor, 165,000 linear feet steel bearing piles, 260,000 square feet steel sheet piling and 58 tons miscellaneous metal work.

465 tons, plant addition for Philadelphia Quartz Co. at Middlesex, N. J.; bids in to Turner Construction Co., Philadelphia.

400 tons, building, Chicago, for American Colortype Co.; bids postponed from Jan. 30 to Feb. 4.

380 tons, factory building, Aurora, Ill., for Barber-Greene Co.

350 tons, brewery addition, Porto Rico; W. F. Koelle, Philadelphia, engineer.

300 tons, factory building, Madison, Wis., for Forsberg Paper Box Co.; bids Feb. 28.

275 tons, dormitory, Pembroke college, Brown University, Providence, R. I.; Gilbane Building Co., Providence, general contractor.

252 tons, West 47th street underpass, Chicago, for Cook county; American Bridge Co., Pittsburgh, low on bids Jan. 21.

225 tons. building, Teachers College, Williamantic, Conn.

200 tons. trestle, Lancaster, Tenn., for Ralph E. Mills.

175 tons, building, Rumford Press, Concord, N. H.

124 tons, 123rd street viaduct, Chicago, for Cook county; American Bridge Co., Pittsburgh, low on bids Jan. 21.

109 tons, dam, Dewey reservoir, Johns Creek, Ky.; bids to U. S. Engineer, Huntington, W. Va.

Unstated, milk plant and garage for Hershey Farms, Long Island City, N. Y.; bids Feb. 18.

REINFORCING BARS . . .

REINFORCED BARS PLACED

150 tons, state agriculture building, St. Paul, to Paper-Calmenson & Co., St. Paul; Lovering Construction Co., St. Paul, contractor; bids Jan. 11.

150 tons, children's ward building, Massachusetts General Hospital, Boston, to Concrete Steel Co., Boston.

REINFORCED BARS PENDING

1500 tons, relocation, approximately 16 miles, Conemaugh division, Pennsylvania railroad, Blairsville-Avonmore, Pa.; bids to U. S. engineer office, Pittsburgh; also 10,000 feet, eight-inch corrugated metal pipe, and 24 miles right of way fencing.

1220 tons, wall and appurtenant works, contract six, Mill Creek, Cincinnati, O.; bids to U. S. engineer office, Cincinnati.

1165 tons, including 700 tons mesh, highway and overpasses, route 25, sections 32A and 16C, Newark and Elizabeth, N. J.; bids Feb. 18 to Spencer Miller Jr. state highway commissioner, Trenton.

500 tons, Washington state highway bridges; bids to Olympia Feb. 5.

485 tons, dam, Dewey reservoir project, Johns Creek, Ky.; bids to U. S. engineer, Huntington, W. Va.

300 tons, building, Rumford Press, Concord, N. H.

265 tons, dam; bids about Feb. 25 to U. S. engineer, Kansas City, Mo.

165 tons, reconstruction lock 2, Monongahela river, Braddock, Pa.; bids to U. S. engineer, Pittsburgh.

100 tons, building, Chicago, for American Colortype Co.; bids Feb. 4.

100 tons, building No. 10, Kankakee, Ill., for American-Marietta Co.

100 tons, building No. 7, Lincolnwood, Ill., for Bell & Howell Co.; bids Feb. 12.

Unstated, five buildings, Decatur, Ill., for A. E. Staley Mfg. Co.; bids Feb. 9.

Unstated, expansion, Laporte, Ind., for Allis-Chalmers Mfg. Co.; bids Feb. 5.

Unstated, 12-story office building, Portland; Ross B. Hammond, general contractor.

PLATES . . .

PLATES PLACED

300 tons, tanks, Lever Bros. Baltimore, to Hammond Iron Works, Warren, Pa., and Bethlehem Fabricators Inc., Bethlehem, Pa.; Stone & Webster Engineering Corp., Boston, contractor.

250 tons, caisson shells, New England Foundation Co. Inc., Watertown, Mass., to International Engineering Works, Framingham, Mass.

PLATES PENDING

500 tons, ⅜ to ½-inch steel plates, Seattle city light penstock; general contract to Paul Jarvis Inc., Seattle, low at $164,016.

Unstated, steel outlet pipes, Anderson dam ranch project, Idaho; Willamette Iron & Steel Corp., Portland, low at $36,502.

PIPE . . .

CAST IRON PIPE PLACED

750 tons, 12 to 2-inch cast iron, Powell Valley water district, Portland, Oreg., to H. G. Purcell, Seattle for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

570 tons, Metzger water project, Portland, Oreg.; general contract to Empire Construction Co., Portland.

500 tons or more, Capitol Highway district improvement, Portland, Oreg.; bids Jan. 30 to C. E. Carter, engineer.

450 tons, 6-inch bell and spigot for Spokane, Wash.; bids to I. S. Fetterman, city purchasing agent, Feb. 7.

100 tons or more, Tacoma, Wash.; bids Jan. 28.

Unstated, 6 and 4-inch and fittings, Yelm, Wash.; bids Feb. 14.

RAILS, CARS . . .

RAILROAD CARS PLACED

Cleveland Transit System, Cleveland, 50 trolley coaches, to St. Louis Car Co., St. Louis.

Montour Railway, 200 all-steel hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

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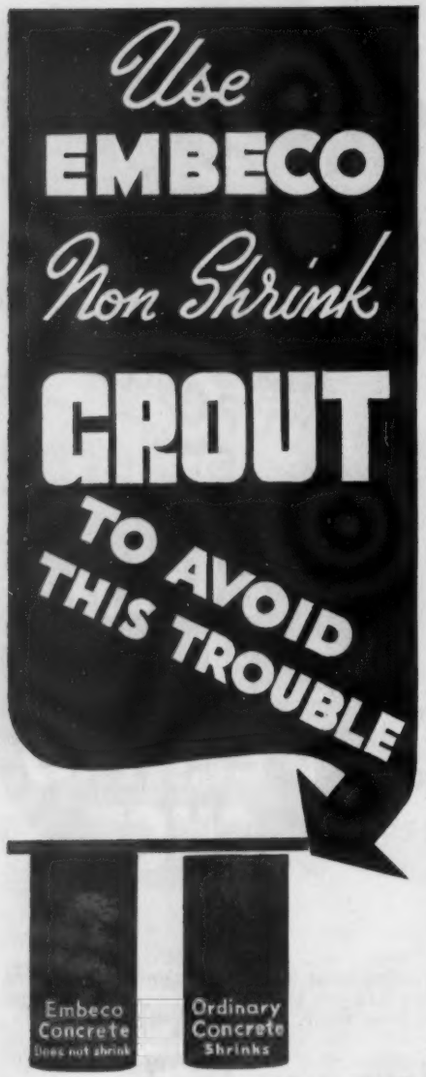

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CONSTRUCTION AND ENTERPRISE

MICHIGAN

BATTLE CREEK, MICH.—A. B. Stoves Inc., Merrill Park, Battle Creek, has been incorporated with $1000 capital to manufacture stoves, by Detroit-Michigan Stove Co., 6900 East Jefferson Ave., Detroit.

BURR OAK, MICH.—Victor Screw Products Co., has been incorporated with $75,000 capital to operate a screw machine business, by A. L. Decker, Burr Oak.

CARROLLTON, MICH.—Saginaw Furnace Co., 701 Carrollton St., has been incorporated with $45,000 capital to manufacture machinery, castings and supplies, by Clarence E. Ahlborn, 421 North Webster Rd., Saginaw, Mich.

CENTERLINE, MICH.—Intricate Tool & Gage Inc., 24400 Mound Rd., has been incorporated with $50,000 capital to manufacture tools, jigs, gages and fixtures, by Edward J. Apel, 860 Three Mile Dr., Grosse Pointe, Mich.

DEARBORN, MICH.—Motor City Kellering Co. Inc., 8944 Williams St., Route No. 5, Dearborn, has been incorporated with $10,000 capital to manufacture tools and dies, by Arthur M. Grace, same address.

DETROIT—Lincoln Forging Co., 618 St. Antoine St., has been incorporated to manufacture forged and machined parts, by Harry V. Wilkie 305 Newport Ave.

DETROIT—Metro Tool & Die Co., 1601 Dime Bldg., has been incorporated with $50,000 capital to manufacture tools, dies and patterns, by George P. Maghielse, 1138 Devonshire Avve., Grosse Pointe Park, Mich.

DETROIT—Active Pattern & Foundry Co., 14035 Woodrow Wilson Ave., has been incorporated with $18,000 capital to manufacture machinery, patterns, jigs and dies, by Harold R. Chilson, 320 East Grand Blvd.

DETROIT—General Gear Co., 6061 Wabash Ave., has been incorporated with $75,000 capital to manufacture gears, tools and gear blanks, by Frank A. Bernstein, same address.

DETROIT—Ginger Machine Products Corp., 16210 Cherrylawn avenue, has been incorporated with $50,000 capital to manufacture fabricated steel products, by George L. Ginger, same address.

DETROIT—Linwood Tool, Gage & Engineering Inc., 13923 Linwood Ave., has been incorporated with $50,000 capital to manufacture tools, jigs, gages and fixtures, by Jerry J. Dika, 18811 Russell St.

DETROIT—Metal Processing & Engineering Corp., 19941 Deering St., Livonia Township, Detroit, has been incorporated with $50,000 capital to manufacture tools, dies, jigs and fixtures, by Archie M. Hunter, 9810 Wisconsin Ave.

DETROIT—Moran Standard Parts Co., 10305 Dequindre St., has been incorporated with $50,000 capital to do general manufacturing, by Machael J. Moran, 4131 Three Mile Dr.

DETROIT—Richard & Trute Tool & Die Corp., 907 Fisher Bldg., has been incorporated with $50,000 capital to do general manufacturing, by Loyal O. Richard, 128 East Maryland Ave., Royal Oak, Mich.

DETROIT—Super Tool Co., 21650 Hoover Rd., Warren Twp., Box 68 Harper Station, Detroit, has been incorporated with $750,000 capital to manufacture cutting tools and machinery, by Sophie Birgbauer, 1004 Buckingham Rd., Grosse Pointe Park, Mich.

DETROIT—Turner Equipment Co., 709 Franklin St., has been incorporated with $50,000 capital to manufacture gasoline tanks for trucks, by James H. Turner, same address.

DETROIT—Bridgewater Machine & Tool Co., 2921 East Grand Blvd., has been incorporated with $100,000 capital to manufacture dies and molded products, by John E. Livingstone, Sr., same address.

GRAND RAPIDS, MICH. — Krucki Machine Inc., 343 Indiana Ave. NW, has been incorporated with $10,000 capital to manufacture tools and dies, by Charles B. Krucki, same address.

GRAND RAPIDS, MICH.—Flottorp Mfg. Co., Kent County Airport, Grand Rapids, has been incorporated with $200,000 capital to manufacture aircraft, transportation and automotive parts, by R. G. Taylor, 31 Manchester Rd., Grand Rapids.

GRAND RAPIDS, MICH.—Union City Stamping Co., 412 Fuller St. NE., has been incorporated with $50,000 capital to manufacture sheet metal products by Dwayne M. Wilt, 1449 Johnston St.

HIGHLAND PARK, MICH.—Primor Products Inc., 14544 Third Ave., has been incorporated with $50,000 capital to do general manufacturing, by Gorton F. Price, 25880 Ivanhoe Rd., Huntington Woods.

JACKSON, MICH.—W. H. K. Machine Co., 1820 Wildwood Ave., has been incorporated with $50,000 capital to do general manufacturing, by William H. Ketts Jr., 904 Francis St.

MANCELONA, MICH.—Mancelona Foundry & Machine Co. has been incorporated with $50,000 capital to mold, cast and machine metals, by Claude A. Woodley.

PETOSKEY, MICH.—Petoskey Tool & Engineering Corp., 314 Howard St., has been incorporated with $60,000 capital to manufacture metal products, by C. Frederick Curtis, same address.

PORT HURON, MICH.—F. Yeager Bridge & Culvert Co., 1701 Kearney St., has been incorporated with $200,000 capital to manufacture steel products, Fred Yeager, same address.

ST. JOSEPH, MICH.—Paramount Die Casting Co., 607 Ann St., has been incorporated with $50,000 capital to manufacture die castings, by Frederick A. Reddel, 838 Greenwood Ave.

MASSACHUSETTS

DARTMOUTH, MASS.—Keith Ice Cream Co., Fall River Rd., North Dartmouth, Mass., has plans by Tallman, La Brode & Rounseville, 222 Union St., New Bedford, Mass., for a one-story 100 x 100-foot plant to cost $55,000.

EAST SPRINGFIELD, MASS.—Westinghouse Electric Corp., 653 Page Blvd., has let contract to Lay Construction Co., 1215 Main St., Springfield, Mass., for one-story 50 x 120-foot and 20 x 90-foot plant additions to R building, to cost about $47,800. Stone & Webster Engineering Corp., 49 Federal St., Boston, are engineers.

SOMERVILLE, MASS.—H. K. Porter Inc., 6 Ashland Ave., Everett, Mass., has let contract to Bond Bros., 77 Ferry St., Everett, Mass., for a one-story 70 x 140-foot and 120 x 180-foot plant to cost about $125,000.

CONNECTICUT

BERLIN, CONN.—Stanley Works, chemical divison, has let contract to Hasson & Downes, 55 West Main St., New Britain, Conn., for a two-story 30 x 65 and 43 x 47-foot factory building, to cost about $75,000.

BRISTOL, CONN.—New Departure Division of General Motors Corp., 269 North Main St., has let contract to P. Allaire & Sons Inc., 350 Riverside Ave., for a steel storage building on North Main St., to cost about $50,000.

FAIRFIELD, CONN.—J. & L. Mfg. Co., Castle Ave., is having plans made for a plant building costing about $40,000.

HARTFORD, CONN.—Allen Mfg. Co., 133

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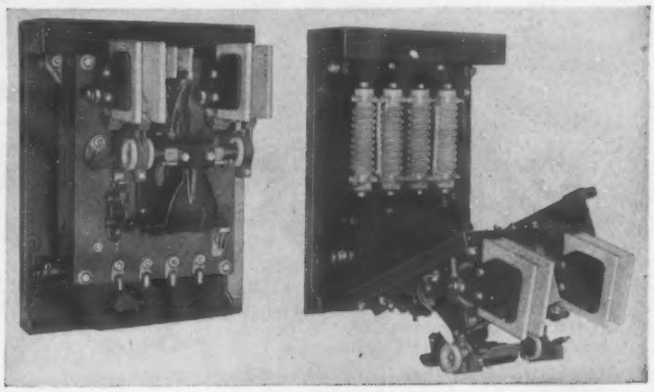
MAGNET CONTROLLER

With arc suppressor and quick drop, automatic for any class of material.



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Two main switches open circuit in series. Reverse and quick drop are automatic. Master contacts carry control circuits only.

The arc suppressor reduces the arc so it is not harmful or disagreeable. Contact tips are thus saved. Arc shields do not burn.

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OHIO reliable MAGNETS

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Sheldon St., has let contract to Bartlett & Brainerd Co., 103 Woodbine St., for a one-story 85 x 100-foot plant on Prospect St., to cost about $140,000.

NEW HAVEN, CONN.—Superior Spring & Mfg. Co., 90 Goffe St., plans a brick and steel plant building, to cost about $40,000. Plans are by G. Dunkleberger, 44 Wolcott Hill Rd., Wethersfield, Conn.

PENNSYLVANIA

JOHNSTOWN, PA.—Cambria Equipment Co., 12 Iron St., will let contract soon for a two-story 125 x 125-foot storage building costing about $110,000. R. C. Celli, Century Bldg., Pittsburgh, is architect.

WEST LEECHBURG, PA.—Allegheny Ludlum Steel Corp., Brackenridge, Pa., has let contract to O. H. Martin, 512 North Homewood Ave., Pittsburgh, for a one-story 31 x 80-foot boiler plant addition and one-story 38 x 108-foot pump house, to cost about $50,000. E. L. Huff, care owner, is engineer.

OHIO

CLEVELAND — Manufacturer's Gasket Co., 10906 Madison Ave., newly incorporated, Niles H. Hammink, manager, seeks to increase production of gaskets, washers and other metal products and is in the market for a 40-ton punch press, power shear and other metalworking machinery.

CLEVELAND—United Aluminum Castings Inc., recently incorporated by Henry L. Gabriel, 19420 Frazier Dr., is establishing operations at 10714 Bellaire Rd.

CLEVELAND—Ferro Machine & Foundry Co., 3155 East 66th St., is adding five penthouses on plant roofs at cost of about $10,000. John Price is president.

COLUMBUS, O.—Ohio Fuel Gas Co., 99 South Front St., has two-year program rebuilding and erecting new compressor stations at cost of $500,000. F. F. Fisher is assistant general superintendent.

DAYTON, O.—Dayton Rubber Mfg. Co., 2342 West Riverview St., has let contract to C. H. Shook Inc., 582 West Second St., for a plant building estimated to cost about $250,000.

ELYRIA, O.—Electro-Alloy Division of American Brake Shoe & Foundry Co., J. L. Mullin, vice president, 389 East Fourteenth St., Chicago Heights, Ill., is building a factory and power plant costing $2,500,000.

MEDINA, O.—Wise Allied Products, Ralph Wise, president, has completed a plant for manufacture of rubber products and plans two other buildings for production of plastic and glass items.

WILLOUGHBY, O.—Willoughby Machine & Tool Co., Second St., will build new plant in summer to increase production of gas converter for coal furnace, building to be 100 x 225 feet, allowing 300 per cent increase.

INDIANA

INDIANAPOLIS—B. & B. Foundry Co., 916 East Michigan St., is building an addition for brass and aluminum foundries, covering 15,000 square feet. E. G. Berger is general manager.

INDIANAPOLIS—F. L. Jacobs Co., Rex C. Jacobs, president, automotive parts and household appliance manufacturer, is building an addition to its appliance plant here to increase production.

ILLINOIS

CHICAGO—Accurate Spring Mfg. Co., 3811 West Lake St., has let contract to L. J. Graf Construction Co., 700 North Michigan Ave., for a one-story 150 x 250-foot plant building to cost about $175,000.

MASCOUTAH, ILL.—City will receive bids March 4 for additions and improvements to municipal power plant, including boiler, stoker, combustion equipment and brick work. Rogers-Schmidt Engineering Co., 611 Olive St., St. Louis, are consulting engineers.

SPRINGFIELD, ILL.—H. Helmle, architect, First National Bank Bldg., is preparing plans for a power plant building at St. John's Sanitorium on Sangamon Avenue Rd., 67 x 121 feet.

DELAWARE

WILMINGTON, DEL.—Delaware Power & Light Co., Sixth and Market Sts., has let contract to United Engineers & Constructors Inc., 1401 Arch St., Philadelphia, for design and construction of an electric power plant to cost about $12 million.

MARYLAND

BALTIMORE—Eastern Container Machinery Corp., 1023 Ridgely St., recently incorporated, plans to get into production by summer. H. D. Greenwood is president.

BALTIMORE—Davis & Hemphill, Elkridge, Md., manufacturer of screw machine products, has installed additional equipment and plans a plant addition soon.

BALTIMORE—Clinton Conduit Co., Eastbound Ave., plans a one-story manufacturing plant to cost about $80,000.

CUMBERLAND, MD.—Air Reduction Co. Inc., Lincoln Bldg., New York, will let contract soon for a chemical manufacturing plant costing about $155,000.

GEORGIA

ATLANTA, GA.—J. M. Tull Metal & Supply Co. has let contract to Wesley & Co., 5 Ivy St. NE, for a warehouse, one-story. 40,000 square feet and office building. Burge & Stone, 401 Palmer Bldg., are architects.

ATLANTA, GA.—Auto-Soler Co., has let contract to Carroll Construction Co. for a plant addition costing about $60,000. Ivey & Crook, Candler Bldg., are architects.

MISSOURI

ST. LOUIS—Southern Equipment Co., 5017 South 38th St., has let contract to L. O. Stocker Co., 806 Olive St., for a one-story 50 x 120-foot warehouse building at 5233 South 38th St., costing about $40,000.

ST. LOUIS—Moog Industries Inc., 6650 Easton Ave., has let contract to J. E. Williams Construction Co., 6635 Delmar Blvd., for a one-story 71 x 141-foot machine shop and office building.

WISCONSIN

MENOMONIE, WIS.—Lang Canning Co. has let contract to L. T. Arnold Inc., 201 North Dewey St., Eau Claire, Wis., for one-story 80 x 160-foot, 40 x 44-foot, 40 x 100-foot, 25 x 120-foot and two-story 40 x 60-foot plant buildings.

MILWAUKEE—Automatic Products Co., 2450 North 32nd St., has let contract to Gebhard, Berghammer Inc., 5420 West State St., for a one-story 100 x 200-foot boiler house, Grassold & Johnson, 734 North Jefferson St., are architects.

OSHKOSH, WIS.—Wisconsin Axle Division of Timken-Detroit Axle Co., 567 High St., has let contract to Ben B. Ganther Co., 78 State St., for a one-story 77 x 175-foot plant addition.

KANSAS

PITTSBURG, KANS.—W. S. Dickey Clay Products Co., Commerce Bldg., Kansas City, Mo., has let contract to W. R. Grimshaw, Hunt Bldg., Tulsa, Okla., for a sewer pipe plant here to cost about $785,000. A. Benberg, New York Life Bldg., Kansas City, Mo., is architect.

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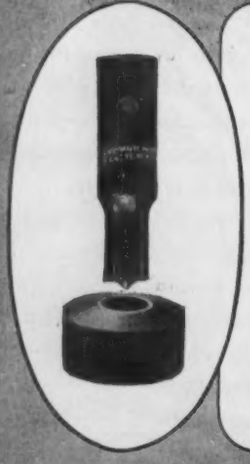

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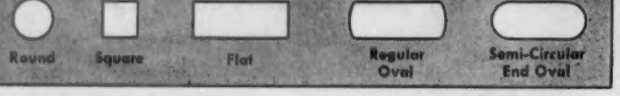

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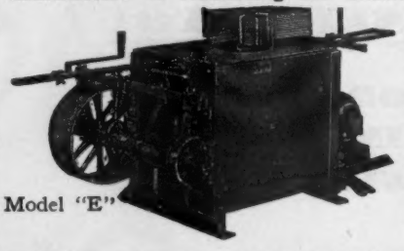

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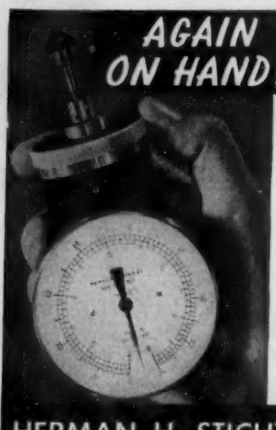

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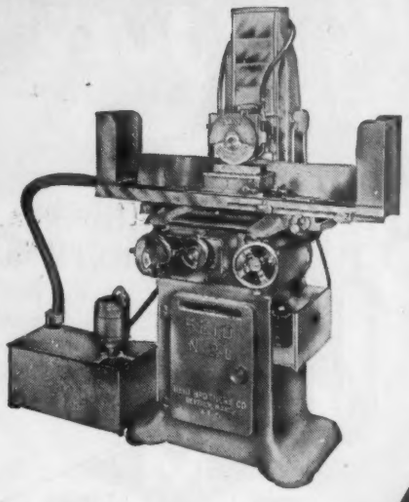

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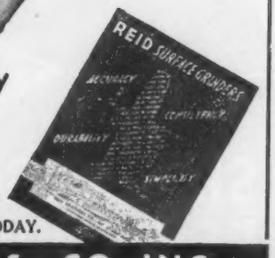

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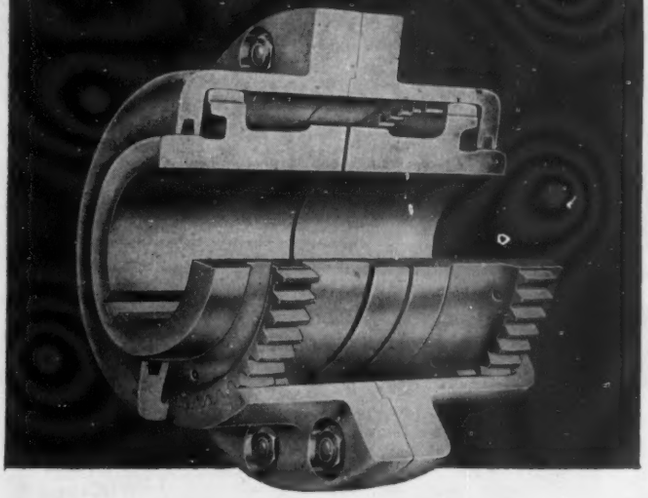

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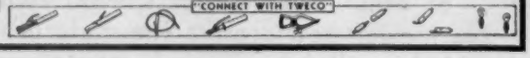

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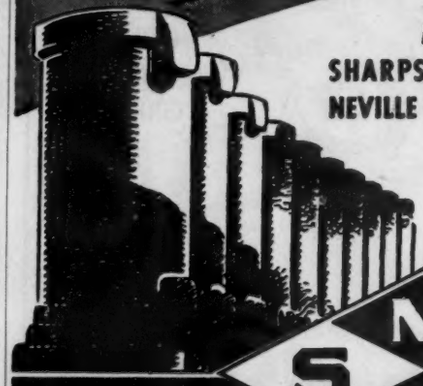

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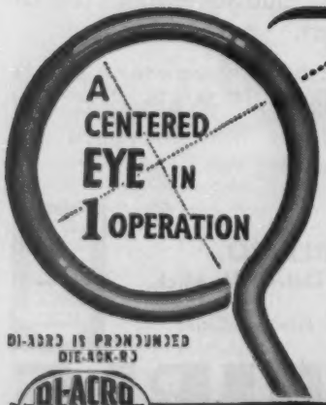

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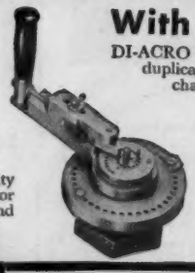

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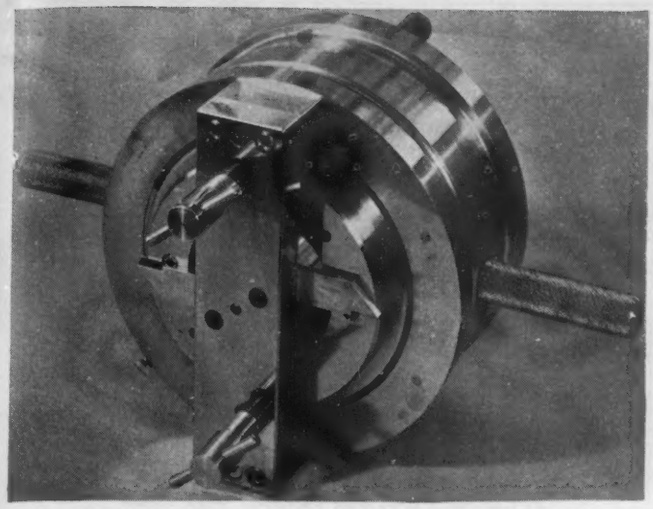

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1 Steel City BRINELL TESTING MACHINE, type A-4, clearance between upright standards 3'8". Motor operated crosshead and pump. Maximum height of work suitable 51". Practically brand new.

Lot—Twenty-one (21) high-cycle GRINDERS, 19 either new, factory rebuilt or used, remaining two gearhead missing only. Complete with motor and 32 KW generator for 180 cycle current to supply required current.

1 Berkley CENTRIFUGAL CASTING MACHINE, V-belt drive, 24" table, with motor but no starter.

150 Lyon Metal, style B, Metal Boxes, size 8½" x 17½ x 7½. Brand new, never used.

2 Dings #1958-B MAGNETIC PULLEYS, 12" diameter x 26" face, complete with shaft and one pair of pillow blocks.

All items listed are in excellent working condition. Current for all drive motors 220 V, 3 phase, 60 cycles. May be inspected. Subject to prior sale. If interested in any or all items, please write to

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CLASSIFIED

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Positions Wanted

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ENGINEERS AND DRAFTSMEN — STRUCtural, experienced in heavy material handling equipment, such as cranes and waterfront unloading structures. Old established manufacturer. Vicinity New York. Reply stating experience, age, salary expected, when available. Address Box 409, STEEL, Penton Bldg., Cleveland 13, O.

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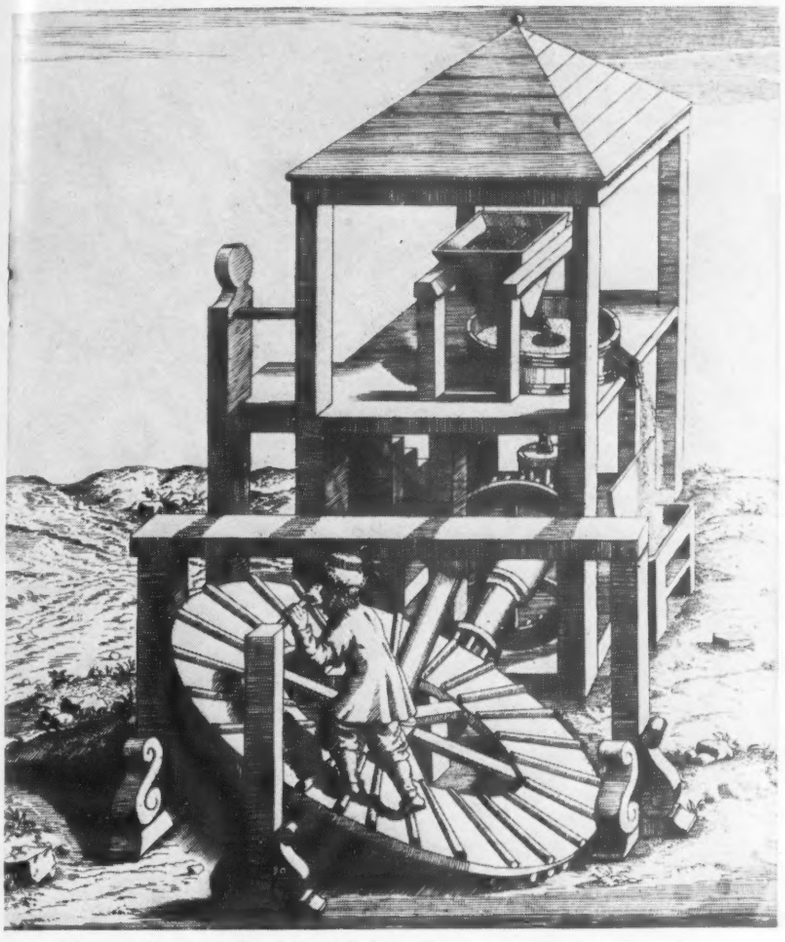
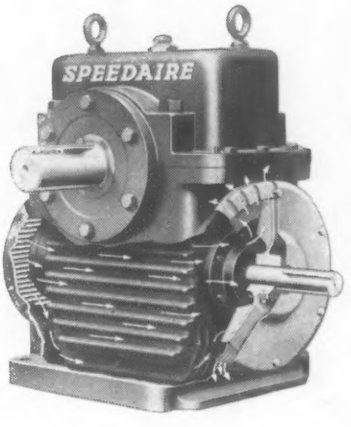
—today it's SPEEDAIRE and — More Horsepower for your Dollar!



Treadmill operated by inclined plane. From a copper engraving, 1662.



IT gave leg muscles a great workout—but at best this clumsy treadmill produced but a trickle of usable power. Contrast it with the Speedaire Fan-Cooled Worm Gear Reduction Unit—newest development in Cleveland's 34-year program of Worm Gear Improvement. Speedaire creates brand-new standards of Worm Gear Performance!

Because it is Fan-Cooled, Speedaire delivers up to *double the horsepower* of standard worm units of equal size, at usual speeds—enabling you to apply economical, right-angle drives to *more of your machines.* Install Speedaire on your new equipment. Catalog 300 brings comprehensive engineering information. Send today.

The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, *Centralized Systems of Lubrication*
In Canada: PEACOCK BROTHERS LIMITED

"More Horsepower for Your Dollar" When You Install Speedaire — Cleveland's New Fan-Cooled Unit

- The Induction Fan continually removes heat by means of a high-velocity air stream scouring the surfaces of the oil reservoir.
- Because Speedaire is Fan-Cooled, it will do more work—and deliver up to *double the horsepower* of standard worm units of equal frame size, at usual motor speeds.
- Speedaire can be installed economically on many applications where other types have been used heretofore—giving you the advantages of a compact right-angle Drive.
- Speedaire is furnished in 6 standard sizes —from 3 to 95 H.P.

Cleveland SPEEDAIRE *Worm Gear Reduction Units*
FAN COOLED

The Manual starter built on the premise *all* motors deserve equal protection

Although the Cutler-Hammer 9115 starter is built for motors that can be manually started, it has the same design, construction and operational features that have made Cutler-Hammer Magnetic Starters a standard wherever electric motors are used. Here you will find the same "drop-of-solder" eutectic alloy overload relay that distinguishes the Cutler-Hammer Magnetic Starter line . . . the same twin-break Vertical dust-safe contacts . . . the same pure, fine silver contact faces . . . the same snap action contact mechanism . . . the same simple design . . . the same dependability . . . the same attractive, clean styling. Only in the absence of the electro-magnetic closing mechanism is there any difference at all. Every motor in your plant no matter how small or "unimportant" has an essential role to play in production. Every motor deserves equal care and protection. Every manually started motor deserves *this* degree of protection. Yet C-H 9115 costs no more than ordinary starters. CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ont.

CASE—Modern styling and design. Standard NEMA type 1 enclosure. 8 x 4¾ x 4. Japanned steel. Interior light finish for high visibility. Cover can be padlocked. Knockouts top and bottom. Ample space, complete accessibility.

CUTLER·HAMMER
MOTOR CONTROL
C·H

OPERATING MECHANISM—Available as skeleton for building into machines, etc. Metal parts rust-proof. Rubber mounting absorbs shocks. Mechanism removable as a unit by loosening one screw—for wiring, etc. Parts and terminals easily accessible.

COVER—"Hook-on" type. Loosening one screw permits lifting off from front. Permits close-fit installation.

CONTACT STRUCTURE—Newly designed for compactness, simplicity, strength and accessibility. Unit base construction easily removed. Positive, quick-make, quick-break, twin-break silver-to-silver contacts mounted on unit base.

OVERLOAD RELAY—Famous C-H eutectic alloy thermal overload relay, most dependable known. Reset by pushing top button. Free-tripping. Rating changed by changing heater coils.

PUSH BUTTON OPERATION—An achievement for this type of starter. Has start, stop-and-overload reset buttons. Start button can be locked to prevent unauthorized operation.

DETAILS—As further evidence of the extreme care and thought in designing this new starter, your attention is called to numerous small yet important details such as self-finding terminal screws, unique staking of cover screw, handy spring lifters on movable contacts, etc., etc.